Class III Survey and Testing of Cultural Resources in Proposed Flood Control System Rights-of-Way, Southeastern El Paso, El Paso County, Texas

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CLASS III SURVEY AND TESTING OF CULTURAL RESOURCES IN PROPOSED FLOOD CONTROL SYSTEM RIGHTS-OF-WAY, SOUTHEASTERN EL PASO, EL PASO COUNTY, TEXAS

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ABSTRACT

This report describes results of Class III intensive survey and limited testing of undisturbed portions of U. S. Army Corps of Engineers proposed flood diversion projects in the southeastern part of El Paso, Texas. The project area is located between the Rio Grande and Interstate 10 in El Paso.

Known sites in the project area include site 41EP418, just outside the Bluff Channel right-of-way, the nearby Vista Hills site, and other sites, many of them recorded during Rex Gerald's survey of the lower Rio Grande in 1978. The single site recorded on this project, 41EP2611, was an extensive, low density ceramic, lithic, and ash stain scatter located on a hill slope 5 km from the Rio Grande; it is within the proposed Bluff Channel right-of-way. The southern portion of the 41EP2611 low density scatter is continuous with the eastern boundary of the similar 41EP418 scatter. Although 41EP418 and 41EP2611 probably represent a single, very large site, they have been separately defined for logistical reasons relating to projected flood control project impacts. Additionally, the area delineated as 41EP418 was not systematically recorded or tested, as it was outside the project right-of-way. Artifacts and features on the surface of 41EP2611 were 100 percent inventoried, and five features were excavated completely. Analytical orientation focused on site complexity, depth of cultural deposits, and quantity of artifacts by temporal period for each major artifact class and each site area. Results showed that the site was a multicomponent Late Archaic and Formative period site with Mesilla and El Paso phase ceramics. The geomorphological study showed that the site was deposited on a relatively stable aeolian surface that was exposed from approximately 8,000 B. P. to at least 660 B. P. and probably until the nineteenth century, when overgrazing and other impacts caused renewed aeolian deposition. There are some indications that the northern part of the site is older than the southern part, based on four radiocarbon dates and ceramic types. Because of major earth disturbing activities at the site and its large size, however, more detailed intrasite analyses were not warranted.

The intact portion of the site is potentially eligible to the National Register of Historic Places because of the presence of hearths and the possibility for dating associated artifacts. Adverse impacts primarily occurred 3-10 years ago and consisted of blading the hill slope to obtain fill for construction, followed by aeolian and colluvial erosion and some pothunting. These impacts have reduced site integrity to approximately 50 percent intactness; many of the hearths have lost charcoal, and much of the materials is surficial in depth. Testing within the right-of-way described in this report constitutes mitigation of adverse impacts to known surface aspects of the site since it demonstrated paucity of subsurface materials and lack of depositional integrity on hardpan surfaces. Should subsurface materials be encountered during construction, they will require archaeological recording.

ACKNOWLEDGMENTS

A number of people contributed to this report. Sandy Rayl, U. S. Army Corps of Engineers (Albuquerque District) Archaeologist, facilitated the work and excavated Feature 7 during her visit to the site. Tom O'Laughlin of the El Paso Centennial Museum was extremely helpful; we especially appreciated his willingness to provide us with complete State of Texas survey forms when we arrived in town after regular working hours. Rex Gerald directed the earlier survey of the area and the recording of site 41EP418. Darryl Newton and Karin Jones comprised the fine field crew; Darryl produced and later drafted the site map. Roman Fojud drafted the test pit profiles. Gary Carpenter of Regan Excavating dug beautiful backhoe trenches under occasionally trying conditions.

Laboratory subcontractors are particularly thanked for the efficient and timely production of their specialized reports; these individuals are Richard Earl and James Jordan (geomorphology), John Jones (pollen), Mollie S. Toll (flotation), and Betty Garrett (petrography). S. Valastro of the University of Texas at Austin Radiocarbon Laboratory provided good turnaround time on the radiocarbon dates. Carolyn Spock of the Texas Archaeological Research Laboratory at Austin provided the site Smithsonian number. Nancy Cochran performed final word processing and formatting for this report.

MANAGEMENT SUMMARY

An intensive cultural resource survey of undisturbed areas of the proposed El Paso Southeast flood control systems (Lomaland Channel and Basin, Bluff Channel and Americas Basin, Chevron Basin, and Phelps Dodge Channel and Basin) was undertaken to determine whether sites were present within the rights-of-way of these flood control systems. One sherd and lithic scatter with features, site 41EP2611, was discovered in indurated dune deposits within the Bluff Channel right-of-way; this was the only site encountered in the project area. Limited testing at 41EP2611 was performed to document depth of cultural deposits, stratigraphy, and the nature of the deposits. A scope-mandated emphasis was placed on recovering chronometric and specialized samples, consisting of radiocarbon assay and pollen, flotation, and petrographic samples, because of their utility for placing the site into chronological context and recovering subsistence information.

A geomorphological assessment was undertaken during testing to further ascertain the potential and extent of buried cultural lenses. Backhoe trenches were placed in consultation with the geomorphologist to determine the presence or absence of cultural deposits, their horizontal and vertical extent, the nature of the fill, the stratigraphy, and density of cultural materials. The geomorphologist examined the trenches for paleosols and other pedological information which could have influenced prehistoric settlement. Nearby road cuts and arroyos were also examined.

Site documentation included definition and location of horizontal site boundaries; description of the location, number, and kinds of surface features; nature of the artifact assemblages; density and frequency of artifacts; site integrity; and research potential. As per scope-of-work requirements artifact analyses focused on quantifying artifacts and classifying them into regionally accepted types which indicate temporal period for site proveniences. For example, sherds were typed as El Paso Brown, El Paso Polychrome, etc. Lithics were sorted into debitage, core and tool classes by material type.

Many areas within the project area have experienced modern development. Disturbance was widespread on surfaces in the Lomaland Channel and Basin, the Chevron Basin, and parts of the Bluff Channel and Americas Basin. In the Lomaland Channel, the proposed right-of-way follows preexisting ditches, parks, and paved roads, emptying finally into the basin, which consists of an irrigated field and school baseball diamond. The outflow channel is a heavily disturbed drainage with much modern trash and fill dirt. The Chevron Basin has been heavily disturbed and is covered by paved roads, railroad tracks, and chemical evaporation ponds. The Bluff Channel right-of-way passes through industrial parking lots, modern dumps, and bulldozed areas. The Americas Basin consists of a once irrigated field, modern dumps, a modern house foundation, and the Juan de Herrera lateral drain. The Americas outflow drain goes through the new Ysleta High School grounds and other roads and ditches.

Site 41EP2611 is a Late Archaic and Formative (Mesilla and El Paso phases) extensive ceramic, lithic, and hearth scatter in dunes along a hill slope formed by the modern Rio Grande floodplain. All five of nine hearths/ash stains with subsurface potential were excavated. Site integrity has been compromised by earth disturbing activities and aeolian action, leaving site deposits largely surficial; no deposits were found deeper than 33 cm below present ground surface. The presently exposed hardpan is the surface upon which artifacts and features occur. Three of the ash stains excavated proved to be less than 10 cm in depth and are presumably largely deflated. Site areas were tentatively dated to Late Archaic and Formative times based on four radiocarbon dates, two points, and painted and plainware ceramic attributes. Because of deflation, which has resulted in the probable removal of many artifacts and loss of context, detailed site interpretation is difficult. Testing was confined to the right-of-way; deflated portions of the site are also within the right-of-way. Intact site portions outside of the right-of-way may be suited to site interpretation, but due to the buried nature of the deposits, data at present are insufficient for detailed interpretation.

Site 41EP2611 clearly offers potential for answering regionally important research questions. The presence of datable artifacts and samples meant that the site was relevant to chronological questions such as refined dating of artifact types and occupation in the area based on subsurface materials to complement details already known from survey. Excavation (including backhoe trenches) showed that this potential was limited by postdepositional activities at the site. With the exception of Feature 1, the five excavated features were largely deflated. The surface stains were large enough to produce two radiocarbon dates, one dating to the Late Archaic period and the other to the El Paso phase. Research potential of the site as exposed on the surface is thought to have been exhausted by the 100 percent inventory of surface artifacts and the excavation of five out of nine hearths located in the right-of-way. If subsurface cultural deposits are encountered during channel and basin construction, however, these materials should be professionally recorded. Subsurface materials have greater potential for depositional integrity than deflated deposits presently exposed at the site.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF FIGURES (CONTINUED)

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

Amy C. Earls

This report details cultural resources survey and testing of sites in undisturbed portions of proposed flood control channels and basins in the U. S. Army Corps of Engineers' El Paso Southeast project area. The project is located in southeastern El Paso, between Interstate 10 and the Rio Grande and near the southeastern city limits. The surveyed areas are the Americas (Bluff) Channel (14,400 feet long and 200 feet wide), the Americas Reservoir Basin (approximately 50 acres), the Americas Diversion Channel (2,400 feet long and 200 feet wide), the Americas outflow drain (1,000 feet long and 200 feet wide), Lomaland Channel (4,200 feet long and 200 feet wide), Lomaland Basin (approximately 40 acres), and Chevron Basin (5 acres). This project builds on the results of a previous project by Mariah Associates, Inc. (Tanner and Acklen 1986), which assessed cultural resources in the proposed flood control area. The earlier report reviewed published and unpublished records of cultural resources in the project area, assessed the integrity of alternative construction areas in order to determine if intensive pedestrian survey was warranted, and evaluated the potential impact of each alternative flood control project location on cultural resources. The assessment compiled data from 119 prehistoric sites representing five surveys and two historic districts. Six archaeological site locations were identified as lying within 1,000 feet of proposed construction rights-of-way. One site was near the Phelps Dodge (Copper System) Alternative B and another was near the Bluff System alternatives (Tanner and Acklen 1986: Figure 1.2). The Phelps Dodge Channel, Basin, and Outfall were surveyed by an ACOE archaeologist (Rayl 1987) and proved to have been greatly disturbed and contained no cultural resources considered eligible for inclusion on the National Register of Historic Places.

A single archaeological site, 41EP2611, was recorded within the Bluff Channel right-of-way (ROW). Limited subsurface tests were performed on portions of the site within the right-of-way to define the extent of cultural deposits. A geomorphological assessment of the Bluff Channel site and its immediate vicinity was undertaken to ascertain the potential and extent of buried cultural lenses.

The scope of work requirements included intensive cultural resources survey, reassessment and limited testing, chronometric testing (providing for radiocarbon, pollen, flotation, petrographic, and archeomagnetic analyses, if possible), and backhoe trenches. Specified under the survey requirements were 20 m or less spacing of transect intervals, collections only as absolutely necessary of items that are highly diagnostic or possessing important research potential, and site documentation. The last category included site staking with rebar, use of State of Texas site forms, and recording specifications of feature description, artifact description, site maps, site depth, site integrity, chronometric potential, and photography. Because only one site was identified in the survey area, a 100% inventory of artifacts was made, rather than estimates derived from sampling strategy.

Limited testing was performed to determine depth of cultural deposits, stratigraphy, and the nature of subsurface deposits. Analyses were limited to studies addressing site complexity, depth of deposits, and quantity of artifacts by temporal period for each major artifact class. Artifact analysis focused on classifying materials into regionally accepted types indicative of temporal periods for each provenience. Detailed artifact analyses were not appropriate to the scope of this contract.

Backhoe trenching was performed to determine presence or absence of cultural deposits, their horizontal and vertical extension, the nature of the fill and stratigraphy, and density of cultural materials. The trenches were examined by a geomorphologist for presence of paleosols and other features. Nearby road cuts and modern arroyos were also examined. The primary goal was to aid in reconstructing the stratigraphic and sedimentologic record of the project area as it relates to prehistoric settlement.

Site 41EP2611 proved to be an extensive ceramic, lithic, and ash stain scatter. Artifact analysis and laboratory reports indicate that the site is a multicomponent Late Archaic, Mesilla, and El Paso Phase occupation. The hearths, dating to the Late Archaic Period and El Paso Phase; the lack of structures; and the low artifact density suggest that the site represents a number of short term occupations over many years, during which the ground surface was relatively stable.

The emphasis on chronology and the geomorphological study allowed placement of the site into regional context. Site data reflect important changes in the Rio Grande Valley floodplain. C-14 samples and artifact types reflect a 660 B.P. or later date for the renewed formation of dunes in the Bluff Channel area. Renewed dunal formation probably dates to the late nineteenth century, when historical accounts document overgrazing and intensive agriculture, which led to periods of vegetative denudation. The sand deposits originating in the floodplain buried many prehistoric materials in the site area until the hill slope was bladed during the last 3-10 years.

The project was sponsored by the Albuquerque District, U. S. Army Corps of Engineers under Contract Number DACW47-85-D-0030 and Delivery Order Number 0006. Dates of investigation were May 14-20, 1987. Field notes, artifacts, and samples will be curated at the El Paso Centennial Museum, University of Texas at El Paso. The State of Texas site survey form is on file at the Texas Archaeological Research Laboratory, Balcones Research Center, University of Texas at Austin.

2.0 SITE SETTING

Amy C. Earls

This chapter provides a brief description of the natural environment in the site vicinity. Geology, topography, climate, and local flora and fauna are discussed. Additional details are provided in Appendices A, B, and D.

2.1 REGIONAL SETTING

The El Paso Southeast study area is located in the Hueco Bolson region of west Texas (Figure 2.1). The Hueco Bolson is a broad, flat intermontane lowland encompassing a large area from south central New Mexico to western Texas. The Hueco Bolson extends from the Franklin Mountains and Sierra Juarez in the northwest to the Hueco Mountains, Quitman Mountains, and Sierra de la Amargosa to the east and southeast (see Appendix D).

Rocks of Precambrian, Paleozoic, Cretaceous, and Tertiary age are exposed as unconsolidated alluvial deposits in the nearby Franklin Mountains; these consist primarily of sandstone, limestone, quartzite, and rhyolite with granite and andesite intrusions. The nearer east slopes of the Franklins contain unconsolidated Quaternary deposits consisting of Precambrian rhyolite, quartzite, and, in lesser amounts, limestone, granite, diabase, sandstone, and cherts. Limestone and cherts are more common on the west alluvial slope (O'Laughlin 1980:9-10). In addition, all of these materials plus obsidian and other material types occur in the nearby Rio Grande gravels.

The Rio Grande is the only permanent source of water in the area. The river's flow varies considerably from year to year and according to the seasons. Much of this variability has been dampened by the construction of Elephant Butte Dam near Truth or Consequences, New Mexico. Runoff water is available in ephemeral streams along the dissected terraces of the Rio Grande floodplain (O'Laughlin 1980:12).

The alternation between glacial and interglacial climates has caused the Rio Grande to cut and partially refill its river valley, forming a series of river terraces along its course. The terrace surfaces have been dissected by ephemeral streams flowing to the lower base levels produced by the entrenchment of the river. The zone of dissected terraces, which includes the Bluff Channel, is called the Valley Border (Figure 2.2).

Modern Rio Grande floodplain deposits are classified as Harkey loam, Harkey silty clay loam, and Sineli silty clay. The aeolian Valley Border deposits are mapped as rolling Bluepoint association (see Appendix D). These soils are suitable for agriculture, as present land use indicates. Soils in the proposed Americas Reservoir, Lomaland Basin, and within 1 km northwest of the northern portion of the Americas Reservoir are currently being used for agricultural purposes. Irrigation pipes have been laid in the former two basins. Additional fields are located to the southeast of the Americas Reservoir and Lomaland Basin and are watered by Rio Grande laterals.

Figure 2.1 El Paso SE Project Area, El Paso SE Cultural Resource Study, ACOE, 1987.

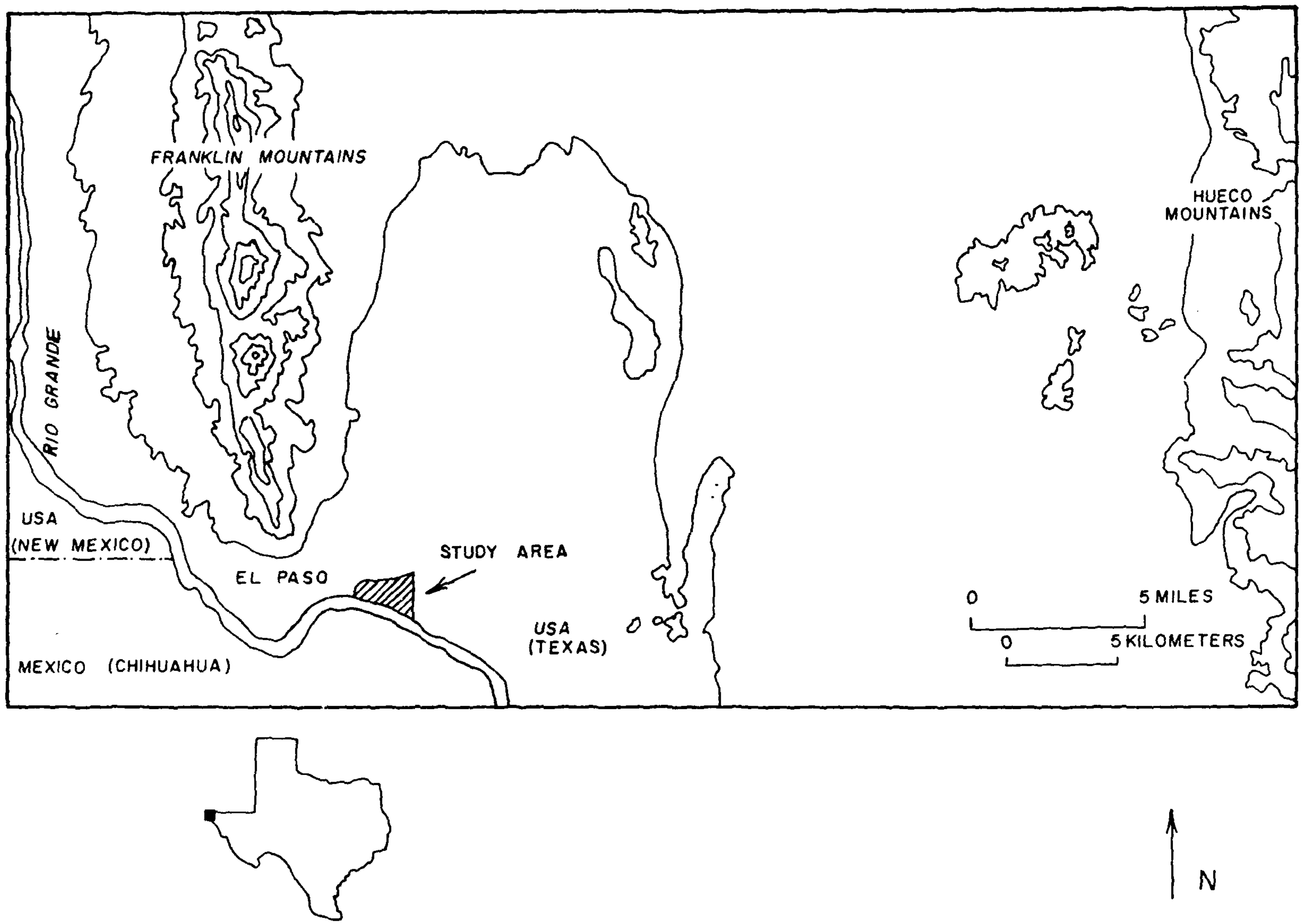
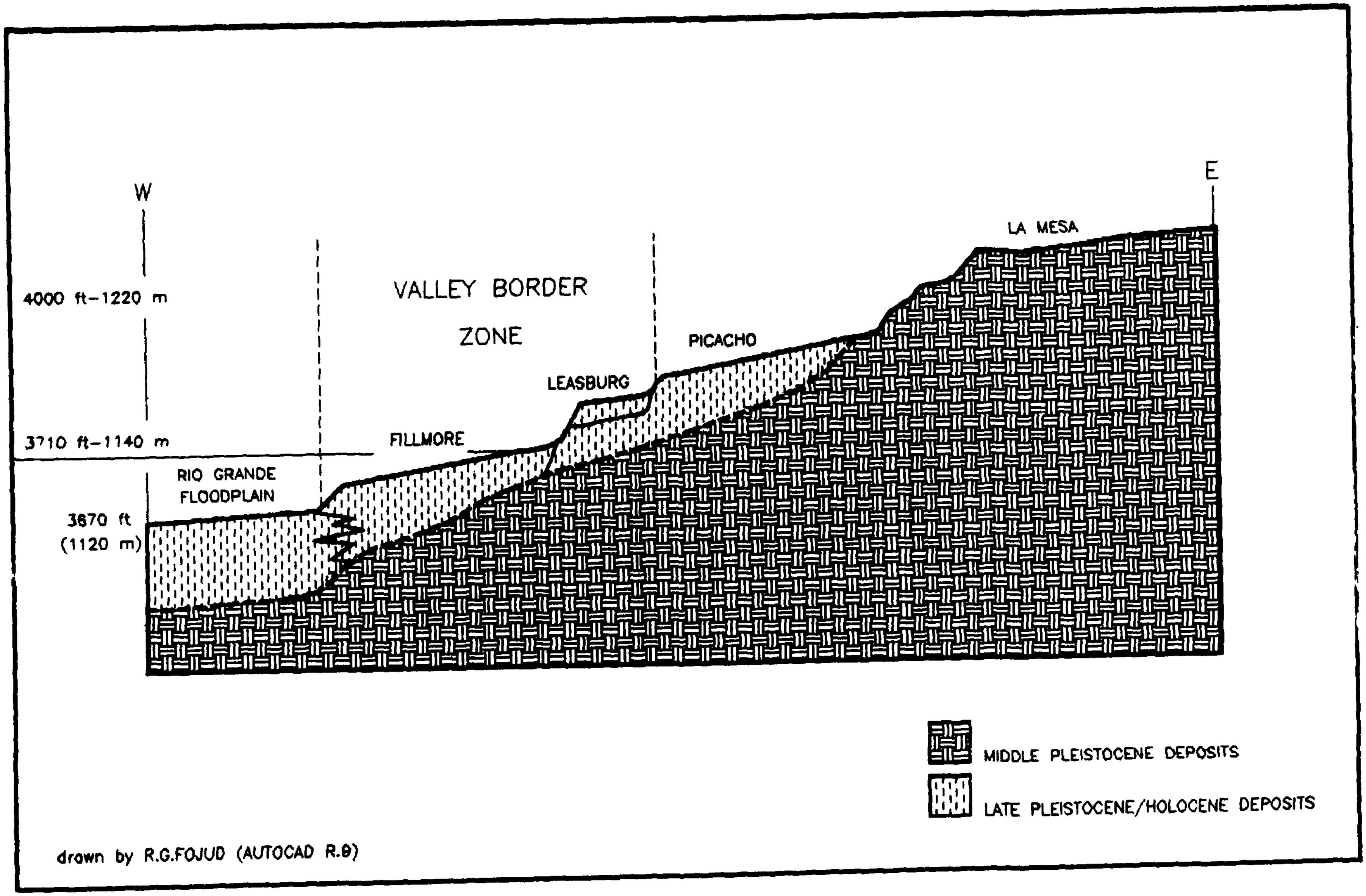


Figure 2.2 El Paso Basin Diagrammatic Cross Section of Terrace Surfaces, El Paso SE Cultural Resource Study, ACOE, 1987.



The study area encompasses territory from the Rio Grande across the eastern side of the valley to a series of bluffs approximately 10 miles away. Elevation ranges from 3650 feet along the river to 4000 feet along the bluffs. The project area encompasses the eastern portion of both the city and county of El Paso. The area covers nearly 92,000 acres or about 41 percent of the city area. Vacant land accounts for about 60 percent or 56,000 acres. The Rio Grande floodplain portion of the project area is characterized by dense urbanization in its upper reaches and rural development and farming in its lower reaches. The arroyo incised escarpment (Valley Border Zone) features sparsely vegetated slopes and bluffs and a significant amount of residential and commercial development. The Hueco Bolson consists of the uplands above the escarpment which are characterized by vegetated sand dunes and nearly level expanses of creosotebush. It is presently being developed for residential and commercial uses (U.S. Army Corps of Engineers 1987:EIS-34).

Extensive residential and commercial development has taken place in much of the study area. The western and southern portions of the area are nearly completely developed, while the northern and eastern portions are less extensively developed. Cultural resource studies have been associated with many of these development projects. Areas not developed for residential or commercial purposes either are being used for agriculture or ranching or are not in use at this time (Tanner and Acklen 1986:3-5).

The modern climate for the El Paso area is semiarid mesothermal with hot days, cool nights, and low relative humidity. Average annual precipitation is 20 cm (approximately 8 inches), with nearly half of that amount falling during the summer months of July, August, and September. Summer precipitation is predominantly from violent thunderstorms of short duration. Winter precipitation tends to be of longer duration and produces less runoff. Because of the low vegetative cover, diurnal temperature variation is commonly as much as 15 degrees centigrade. The average number of consecutive frostfree days is 248 (O'Laughlin 1980:11-12). Prevailing winds are from the north (October-February), south (June-September), and west-southwest (March-May); spring winds have the greatest average velocities (Fields and Girard 1983:24).

Vegetation in the region is typical of mixed Chihuahuan desert and Texas succulent desert zones. Taxa include mesquite (*Prosopis*), snakeweed (*Xanthocephalum*), yucca (*Yucca*), agave, cacti, creosote (*Larrea tridentata*), and grasses (*Poaceae*).

Fauna include black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), coyote (*Canis latrans*), and a variety of small mammals including shrews, rats, and mice.

Environmental change is discussed in Appendix D and merely summarized here. Packrat midden studies from the Sacramento, Guadalupe, and San Andreas Mountains and Hueco Tanks document the change in regional climate from the last full glacial maxima about 18,000 B. P. to essentially modern conditions approximately 4,000 B. P. Regional conditions during the Holocene, documented by pollen and additional packrat studies, can be classified into the transitional 14,000-8,000 B. P. period, the 8,000-4,000 B. P. Altithermal period, and the 4,000 B. P.-present Late Holocene or post-Altithermal period.

Most workers recognize Late Holocene times as a period of fluctuating temperature and precipitation patterns. The variability is apparent in the area's tree ring record and in the 50-100 m rise in the lower tree line of junipers in local mountain ranges. In the El Paso area, the Altithermal appears to have been both warmer and wetter than present; vegetation was stable desert grassland. Historical environmental change probably relates to a combination of overgrazing and a climatic shift to lower summer precipitation. Flotation analysis at 41EP2611 supports the lack of change in the last 4,000 years; taxa are those presently found at the site. The pollen analysis produced similar results; the abundance of Cheno-Ams in the pollen suggests summer dominant precipitation, characteristic of Altithermal and Late Holocene times. The possible exception is the *Quercus* grains, which could indicate an earlier wetter period.

2.2 SITE 41EP2611 LOCAL ENVIRONMENT

The single cultural resource located is the Bluff Channel site, 41EP2611, at 3670-3710 feet. The nearest natural water source is an unnamed drainage 1.5 km to the west. The site extends from near the edge of the historical floodplain at approximately 3670 feet (at the Juan de Herrera main lateral irrigation ditch) up into the Valley Border zone at approximately 3740 feet. Much of the site area is covered by a layer of active aeolian sand.

Geomorphological study at the site suggests that the soils are a result of aeolian and fluvial processes during the Holocene Epoch. The site is ideally situated to receive winds and sand from the Rio Grande floodplain, being northeast of the river and subject to prevailing southwest winds. The establishment of the present Rio Grande floodplain elevation and the change from wetter Pleistocene pluvial to drier Holocene climates approximately 8,000 B. P., as well as pedogenic analysis, indicates that site deposits are no older than that date. The C-14 dates on cultural features on the stabilized lower aeolian deposits and pedogenic and climatic evidence suggest that these deposits are at least 4,000 years old. Historical evidence of intensive nineteenth century overgrazing and agricultural activities, as well as the total absence of soil development, suggests that the upper active aeolian deposits are Late Holocene and probably nineteenth century in age. Thus, for a period of more than 3,000 years between 4,000 B. P. and 660 B. P. (the date of a later feature located on the lower aeolian deposits), there were relative surface stability and soil formation at the site.

Site vegetation includes *Prosopis* (mesquite), *Larrea tridentata* (creosote bush), grasses, and *Xanthocephalum* (snakeweed). Flotation results suggest that *Amaranthus* (pigweed), *Cactaceae* (probably pricklypear), *Cleome* (beeweed), *Phacelia* (scorpionweed), *Portulaca* (purslane), and *Suaeda* (seepweed) are present in the site vicinity, based on unburned seed contaminants identified during the flotation analysis (Appendix A). *Atriplex* (four wing saltbush), *Salsola* (Russian thistle), *Candalia* (gray thorn), *Crucillo* (Mexican blue wood), bunch grasses, and ephemeral herbs also are present on unbladed land east of the fence. Fauna noted on the site are black-tailed jackrabbit, cottontail, quail, bullsnake, and lizard.

3.0 BRIEF CULTURAL RESOURCE OVERVIEW

Amy C. Earls

The prehistory of the El Paso Southeast project area is less well known and documented than the history. Historical activity was focused on the Rio Grande because of agricultural considerations. It is uncertain to what extent prehistoric activities were valley-focused.

3.1 PREHISTORIC CULTURE HISTORY

Prehistoric use of the El Paso area has been classified according to the following periods.

PaleoIndian	9,000 - 6000 B. C.
Archaic	6000 B. C. - A. D. 200
Mesilla Phase	A. D. 200 - 1200
El Paso Phase	A. D. 1200 - 1400

Detailed summaries of these periods may be found in a number of sources (Anyon 1985; Fields and Girard 1983; Lehmer 1948; O'Laughlin 1979, 1980; Whalen 1978, 1980).

Much cultural resource survey work in the immediate project area was performed in 1978 by Rex Gerald of the University of Texas at El Paso. This work was spurred by a Texas Historical Commission grant to examine poorly known areas in the lower Rio Grande Valley subject to development (Thomas C. O'Laughlin, 1987, personal communication). The valley floor and floodplain habitats characteristic of the project area are among the archaeologically least studied environmental contexts in the region, compared to the low desert, runoff, high desert, and lower (Hueco) mountain environmental zones on Fort Bliss Military Reservation approximately 7 miles (11 km) north of the project area (Whalen 1978:2-5). The Texas Historical Commission sites represent a significant component of Late Archaic and ceramic period adaptation in the El Paso area (Tanner and Acklen 1986:23).

Local PaleoIndian and Early-Middle Archaic finds are primarily cross-dated from other regions of the Southwest. The single exception consists of obsidian hydration dates from 41EP1590, which date 7,000 B. C. (Kauffman 1984). This site is an extensive sparse scatter of lithics and ceramics located approximately 3.5 miles (5.5 km) north of the present project area. Isolated occurrences of PaleoIndian points are known from elsewhere in the Hueco Bolson (Brook 1968, Quimby and Brook 1967). The probability of surface PaleoIndian or earlier Archaic finds in the project area is low because of recent extensive aggradation of the lower Rio Grande Valley (O'Laughlin 1980:11). This aggradation began approximately 6,000 B. C. with the formation of the Rio Grande's current floodplain (see Appendix D). Aeolian processes may have also acted to bury cultural deposits in bluff areas (Tanner and Acklen 1986:21). This activity has been offset somewhat by recent construction and fill removal in the lower Bluff Channel area.

The Archaic period is poorly represented in the El Paso Southeast project area, and no Archaic sites in the area are well-defined. At least some of the 61 lithic scatters in the area lacking diagnostics (identified using the database of 73 sites with archival information from Tanner and Acklen [1976]) probably date to the Archaic and especially to the latter part of that period (Whalen 1978, 1980; O'Laughlin 1979, 1980). Portions of nearly all sites in the project area having temporally diagnostic items can be assigned to the ceramic period, but many of these may overlie unrecognized Archaic locations (Carmichael 1984; Tanner and Acklen 1986:22). Work by Whalen (1978:14) suggests that many stone tool and other artifact types continued essentia ly unchanged from the Archaic to Mesilla phases; Archaic camps identified by radiocarbon dating are very similar in size, placement, and general artifact assemblage and density to camps of the succeeding Mesilla phase.

The best-known Archaic site is the Keystone Dam Site in northwestern El Paso, which was tested as part of archaeological investigations for the U.S. Army Corps of Engineers flood control project in northwestern El Paso. This site contained small circular Late Archaic brush structures constructed over shallow depressions. During the Archaic Period these structures were occupied primarily during winter and used for food storage much of the year. In contrast, the Formative Period occupation indicated brief use of the site for roasting food. Archaic lithics at this site proved to be smaller and of finer-grained materials than those of the Formative, which are larger and were probably used in an expedient manner (O'Laughlin 1980).

The second best known Archaic site in the El Paso area is 41EP325, also investigated as a result of the U.S. Army Corps of Engineers Keystone Dam Project. Common tools at the site were core flakes and unthinned cores with edge modification. The site was occupied on a short term basis, with the importance of leaf succulent processing, seed processing, and possibly hunting activities decreasing from Middle to Late Archaic times (Fields and Girard 1983).

The single excavation project nearest the study area was the Vista Hills site, 41EP1590, in northeastern El Paso (Kauffman 1984). This site was similar in its multicomponent assemblage and environmental setting to 41EP2611. A series of obsidian hydration dates led the archaeologists to infer a PaleoIndian occupation in the absence of diagnostic artifacts. Also recovered were Archaic materials and Mesilla phase ceramics. The Vista Hills excavation recorded complex erosional and depositional sequences producing cultural context of doubtful integrity. Kauffman's (1984) recommendation was for greater use of obsidian hydration "for dating and interpreting the low density surface artifact scatters and amorphous fire-cracked rock scatter sites that make up the majority of the Jornada Mogollon area cultural record" (Kauffman 1984:67). Kauffman (1984:68) concludes that the site was a hunter-gatherer temporary campsite with the Mesilla ceramics apparently (from a later occupation) resulting from logistical Puebloan activities. Site documentation provides a striking record of the amount of reuse of both raw materials and site locations. This reuse has undoubtedly complicated the archaeological interpretability of ephemeral sites occurring in favored desert locations (Kauffman 1984:69).

The single site (41EP2611) located during survey of the El Paso Southeast project area was, in respect to time period and artifact density, similar to the 41EP1590 site. Located along the Bluff Channel, 41EP2611 contains numerous hearth stains and some fire-cracked rock, along with Mesilla and El Paso phase ceramics. Three C-14 dates for 41EP2611 are for the Late Archaic phase, and one is for the El Paso phase. Sites 41EP2611 and 41EP1590 were also similar in their low density, primarily surficial scatters. Feature 2 at 41EP1590 was similar to many of the Bluff Channel site features in its manifestation as a dark charcoal and ash stain; its size was more similar to that of Feature 6 of Site 41EP2611 than the more common smaller features at 41EP2611. No fire-cracked rock or burnt caliche was associated with Vista Hills site Feature 2, like most of the Bluff Channel site features, and it was in an area disturbed by vehicular traffic, similar to mechanically disturbed feature areas on the Bluff Channel site (Kauffman 1984:26).

Excavation of 42 features on the La Mesa geomorphic surface in the southern Mesilla Bolson near Santa Teresa, New Mexico, provides comparable information from a higher elevation but similar aeolian depositional context. The features are found at the interface of two aeolian sand deposits, the older of which dates to approximately 2,200 B.P. In this area, artifacts in blowout areas are lag deposits resulting from aeolian removal in historic times. Contrary to expectations, subsurface features were present even in highly deflated areas. Both surface and subsurface feature and artifact distributions were fairly continuous in low density across the landscape (O'Leary 1987).

In comparison to preceding periods, the approximately 1,400-year Formative period, consisting of the Mesilla and El Paso phases, has been intensively investigated. Although the original distinction between the Archaic and Formative periods related to mobile hunting and gathering and sedentary farming and village life, it is now generally thought that the only obvious difference is the addition of ceramics and the bow and arrow to an otherwise Archaic assemblage. Early Formative adaptations are now seen as being very similar to those of the Late Archaic (Fields and Girard 1983:39).

Lehmer's (1948) original scheme of Mesilla, Dona Ana, and El Paso phases has been modified by Whalen (1978) and others. The Dona Ana Phase was originally defined as a transitional phase during which painted ceramics and above ground architecture were adopted. The lack of material associations for this transitional phase have led some investigations to question its validity. Radiocarbon dating suggests the Formative Period began in the early centuries A. D. Present evidence indicates that changes in settlement patterns, subsistence practices, regional interaction, population density, and social group integration occurred during the Formative period. The early Mesilla phase is seen as closely resembling the Archaic with small, flexible social groups subsisting primarily on wild plant foods and faunal resources with some cultivation. Residential mobility was reasonably high, and population density appears to have been low. On the other hand, El Paso phase people lived in communities, were farmers with a secondary reliance on food gathering and hunting, participated in considerable extraregional interaction, and experienced relatively high population density. Sites were both residential and logistical, with people living in pueblos near agricultural lands (Fields logistical, with people living in pueblos near agricultural lands (Fields and Girard 1983:39-40). The causes of the abandonment of the El Paso area at about A. D. 1400 are unknown but probably relate to a widespread adjustment in population or subsistence-settlement organization.

Information on 73 of 119 prehistoric sites in the project area is discussed in Tanner and Acklen (1986; see Chapter 1.0). Data are based on surficial evidence and are drawn from site forms. Forty-seven sites are observed in upland dunes at about 4,000 feet (41EP162-208) and twenty-four sites within the former Rio Grande floodplain at 3680-3740 feet. The major apparent difference between the two groups of sites is the greater density of ceramics on floodplain sites. This pattern may suggest age differences or differing site functions. Buried sites were predicted to be encountered by substantial earth disturbing activity. The most common site type in both areas is artifact scatters with fire-burned caliche.

Site 41EP2611 agrees with the pattern of high ceramic densities on floodplain sites. Because it was a buried site before blading removed much of the fill, it is also informative on site visibility patterns. Although fire-cracked rock is present on the site, hearth stains are much more common. It may be that these stains are underrepresented in the archaeological record of the area because of their lower visibility, particularly in areas of the Hueco Bolson with unstabilized ground surfaces. The primary reason that they are visible at the Bluff Channel site is because of earth disturbing activities, which have removed historical fill and exposed the former stabilized dune surface on which many heat processing activities took place. The high ceramic versus fire-cracked rock density may indicate that cooking in ceramic containers was more prevalent than stone boiling at the site.

3.2 HISTORICAL PERIODS

The historical narrative is largely extracted from Tanner and Acklen's (1986) assessment of cultural resources in the project area. The 400 year time span of El Paso history includes the indigenous Mansos and Sumas, Pueblo relocation from New Mexico following the 1680 Pueblo Revolt, the Mexican Revolution and Mexican control of the project area, Republic of Texas occupation, and integration of El Paso into the United States economy. The reader is referred to Day (1981), Morrow (1981), Sonnichsen (1980), and Timmons (1981) for a broader historical discussion.

The first documented European presence in the El Paso valley occurred in 1581 when Captain Francisco Sanchez Chamuscado and Fray Augustin Rodriguez, along with 11 additional men, passed through on an exploratory mission to Pueblo country in the north. A similar expedition one year later also passed through the valley. Although these expeditions may have produced some localized disease outbreaks in indigenous populations, their effect otherwise was minimal. Chamuscado and Rodriguez described the natives as "living in grass huts and eating locally gathered plants and small animals" (Bolton 1946:145, 171).

No cultural resources are known to date to this exploratory phase. Since the valley acted as a north-south travel route, however, early contact sites may possibly be present in the project area (Tanner and Acklen 1986:31). Extensive aggradation of the Rio Grande Valley in the El Paso vicinity could have buried such sites as much as 2 m below the surface (Sick et al. 1983).

Known native residents of the El Paso Valley were the Mansos and Sumas, who lived by hunting and foraging. These people may have been replaced by later Apache populations. No sites are known to relate to any of these groups, although lithic scatter and feature sites could be the result of Suma, Manso, or Apache occupation of the area (Tanner and Acklen 1986:32).

Spanish influence over the Rio Grande Valley slowly increased until the Pueblo Revolt of 1680. Governor Otermin and more than 2,400 Spanish settlers and 317 Piro, Tompiro, and Tiwa Pueblos retreated down the river to El Paso in the early fall of that year. The refugees reached El Paso del Norte (present-day Juarez) in October 1680, and settled in the general vicinity of the study area. The missions at Ysleta, Socorro, and San Elizario were established after the Spanish retreat to El Paso. These missions and associated sites constitute a significant portion of the historical resource base in the project area. Since many residents of southern El Paso trace their ancestry to the days of the Pueblo Revolt, these 400-year-old ties have a deep-rooted relevance for the present. The communities of Ysleta, Socorro, and San Elizario are the oldest permanent European settlements in Texas; many standing historical structures (from the eighteenth century) are still present (Tanner and Acklen 1986:33).

The Ysleta and Socorro districts of El Paso are particularly interesting, not only because of their antiquity and culturally diverse heritage, but also because of the large number of historic structures still standing and in use. The most impressive such structure is the Ysleta Mission, which was constructed in 1740 or 1744, on the same site as the mission built in 1691 (Burrus 1981, Chronology). The Ysleta Mission is listed on the National Register of Historic Places as 41EP39 (Tanner and Acklen 1986:33).

The first permanent mission in Socorro was built between 1681-1691 to serve the Piro Indians and Spanish settlers (Morrow 1981:18; after Burrus 1981, Chronology). That structure was destroyed in a flood in 1829. Recent archaeological research may have located the site of this original Socorro mission (Rex Gerald, 1986 personal communication). This potential mission site may be eligible for listing on the National Register of Historic Places. The present day Socorro mission was relocated on higher ground following the 1829 flood. The new church was completed and dedicated in 1843 (Day 1981:6). This site is listed on the NRHP (Tanner and Acklen 1986:35).

Morrow (1981) recorded 313 historic structures associated with the Mission Trail area. The majority of these buildings, 274 of 313, are adobe structures with various stylistic attributes. It is possible that the oldest of these buildings could date to the 1680 developmental era. However, given the propensity of the Rio Grande to change course and destroy everything in its path, it is not likely that standing structures will date to that early age. Association with the 1740 mission, a portion of which is part of the existing Ysleta Mission, seems more possible (Tanner and Acklen 1986:35).

There is the possibility that buried sites associated with the pre-1829 flood missions at Ysleta and Socorro could be discovered within the study area. Known documentary sources do not mention any specific sites, but the literary evidence is far from complete. There is also the possibility that the extensive Archives of the Church of Guadalupe in Ciudad Juarez (Bolton 1946:462-463) could have as yet undiscovered documentary information regarding sites in this area (Tanner and Acklen 1986:35).

Spanish authority in the area north of El Paso was reestablished in 1692 when Governor Diego Jose de Vargas reconquered the Pueblos. Between 1692 and 1800 life in El Paso apparently underwent little change. The area's population had increased to 5,000 persons by 1750 (Day 1981:5). In 1751 a Spanish land grant was issued to the Ysleta inhabitants. The land grant was an important political development because it meant a more secure economic and political situation for residents of the El Paso Valley. It seems likely that this situation may have enhanced the potential for there to be structural or artifactual evidence from that time in the archaeological record. This increases the possibility for there to be cultural resources, especially in the form of residential structures, agricultural facilities and especially irrigation "acequias" to be found in the study area (Tanner and Acklen 1986:36).

Since the Spanish Colonial era, many Pueblos who were brought south after the Pueblo Revolt were assimilated by the Spanish, Mexican, and Anglo-American populations (Day 1981:6). Only the Tiguas remain a distinctive cultural entity with a reservation in Ysleta. The Tigua Reservation contains many 100-300-year-old adobe structures, which probably constitute significant cultural resources (Tanner and Acklen 1986:36-37).

The Tigua Ceremonial Gathering place, also called the Tigua Center, is considered a sacred place according to Raymond Apodaca, Executive Director of the Texas Indian Commission, and Ray Ramirez, superintendent of the Tigua Reservation. Apodaca pointed out that plans for road construction in the vicinity were altered to avoid this site. The site is situated in the center of the original Tigua settlement, though it is not the point on which the Spanish land grant is based. The Ysleta mission church was the point on which the land grant, of "a league in each direction" was based (White 1961:68). The Tigua Ceremonial Center is included in the area of the proposed Ysleta National Register District (Tanner and Acklen 1986:38).

During Spanish Colonial times, the Apaches increased in importance in an adversarial role. No material evidence of Apache presence has been identified archaeologically. However, the Apaches are mentioned in the context of raiding the Spanish settlements. Oral history accounts reference three possible Apache burial locations in the project area, based on tales of Tigua Pueblo elders. Locations (marked on Figure 2.1) are on prominent ridges, thought to be places where hunting ceremonies were conducted (Tanner and Acklen 1986:37-38).

When the Mexican independence movement erupted into an armed revolution in 1810, Spanish military personnel from the San Elizario Presidio (just south of the project area) were sent to fight in the revolution in the south. The communities in the El Paso area became part of the new Republic of Mexico in 1821 (Morrow 1981:52, Timmons 1981:17). The El Paso Valley became part of the Texas Republic following the Texas Revolt in 1836. Initial effects of this action on the valley were minimal. Eventually, Texas Ranger outposts were established in the valley. Several buildings in Ysleta were used as Texas Ranger quarters and are presently standing. Those buildings still stand at 8728 and 8729 Old County Road and according to the Morrow study (1981:198) are significant historic resource sites. These buildings are within the proposed Ysleta National Register District (Tanner and Acklen 1986:38-39).

The El Paso Valley became part of the United States in 1848 following the Treaty of Guadalupe Hidalgo, which resolved the conflicts of the Mexican War. Much of the war centered on the lower Rio Grande, and during 1846 several skirmishes were fought in the El Paso area before Colonel Alexander Doniphan took control of the region for the United States in 1846 at the Battle of Brazito, some 28 miles north of El Paso (Morrow 1981:53). No actual sites associated with the war have been documented in the project area. An unfortunate result of United States occupation was the destruction of many of the municipal archives by soldiers stationed in government buildings (Tanner and Acklen 1986:39). The project area became part of El Paso County, Texas, in 1850. From that date until 1900, the region saw part of the great westward migration beginning in 1848, Butterfield Overland Mail stage coach and mail service in 1858, and secession from the United States occurred in 1861 (Tanner and Acklen 1986:39-40). A company of California volunteers occupied the old presidio at San Elizario during the Civil War; this is the only site known to relate to the war.

The Texas Rangers became an important influence during the 1870s as they attempted to control marauding Apaches. Their post was located on Old County Road in Ysleta. The Waugh House and Hansen House are two historical structures dating to the second half of the nineteenth century; it is assumed that these houses are related to Anglo-American influence in the project area (Tanner and Acklen 1986:40).

In 1881 the first railroad was built through the El Paso Valley, and the region became an important transportation center connecting the Atchison, Topeka and Santa Fe; the Texas and Pacific; and the Mexican Central railroads (Morrow 1981:27). The community of Clint became the most historically significant railroading site. It is located south of the El Paso Southeast study area (Tanner and Acklen 1986:41).

The El Paso Southeast project area today is a suburb of a thriving sunbelt metropolis with a population of over 700,000 people. The cultural diversity of the valley is particularly evident in the Ysleta-Socorro portion of the project area.

4.0 ARCHAEOLOGICAL FIELD METHODS

Darryl Newton and Amy C. Earls

4.1 SURVEY COVERAGE

The project area is located near the southeastern edge of the city of El Paso. A majority of the land requiring archaeological survey has been heavily impacted by construction and development. Three basin areas and a channel ROW 200 feet wide were subject to intensive pedestrian survey during the course of the project (Figure 4.1). Survey of the Bluff Channel was accomplished in three segments by a crew of three persons positioned at constant 15 m intervals. Using 1" = 100' project maps, landmarks, and compass readings, the crew marked the channel centerline with pin flags. Half the ROW (one side of the centerline) was surveyed to the end of the segment, usually a well-marked breaking point, such as a street. The crew then made a return sweep on the opposite side of the centerline, retrieving the pin flags, to cover the 200-foot width of the ROW. Distance between crew members was increased to 20 m for the Americas Reservoir and Lomaland Basin area surveys where compass readings were used to insure accurate transects and retrievable pin flags served as transect markers.

All prehistoric cultural artifacts and features were recorded. Historical remains predating 1940 were considered archaeological and were subjected to the same considerations and procedures as prehistoric finds. Resources judged to postdate 1940 were not systematically recorded.

4.2 DEFINITION OF SITES AND ISOLATED OCCURRENCES

Site identification criteria were the presence of five or more culturally modified objects (tools, debitage, historic debris), or a tool associated with two or more debitage artifacts, or a feature with or without artifact association. Features were indicated by discrete thermal evidence (ash stain, fire-altered rock, etc.), by a structure or structural remnant, or by other culturally detectable nonartifactual alterations (petroglyph, etc.).

An isolated occurrence was defined by the presence of four or fewer pieces of debitage or tool associated with two or fewer pieces of debitage within a 20 m^2 area.

The Lomaland Channel and Basin were disturbed throughout (Figure 4.2). Survey crews drove from the channel intake point along an existing ditch in Yucca Park down Carolina Drive, past two more baseball fields in a park on Tarrant Road, and down Stanford Court, which dead ends at a parking lot above the basin. The crew then performed a pedestrian survey of the basin. The outtake area of the north basin occurs along an existing broad channel with gravel fill that contains modern trash and recent fill dirt along the banks and at its upper end. The southeast corner of the basin has been heavily disturbed by machine excavation. In the north portion of the basin itself is still another baseball park. Crews surveyed the remainder of the basin at 20 m intervals. The basin has been used as a field for some time and has been disturbed by agricultural activities (canals define the south edge of the basin).

Figure 4.1 Surveyed Areas and Site Location, El Paso SE Cultural Resource Study, ACOE, 1987.

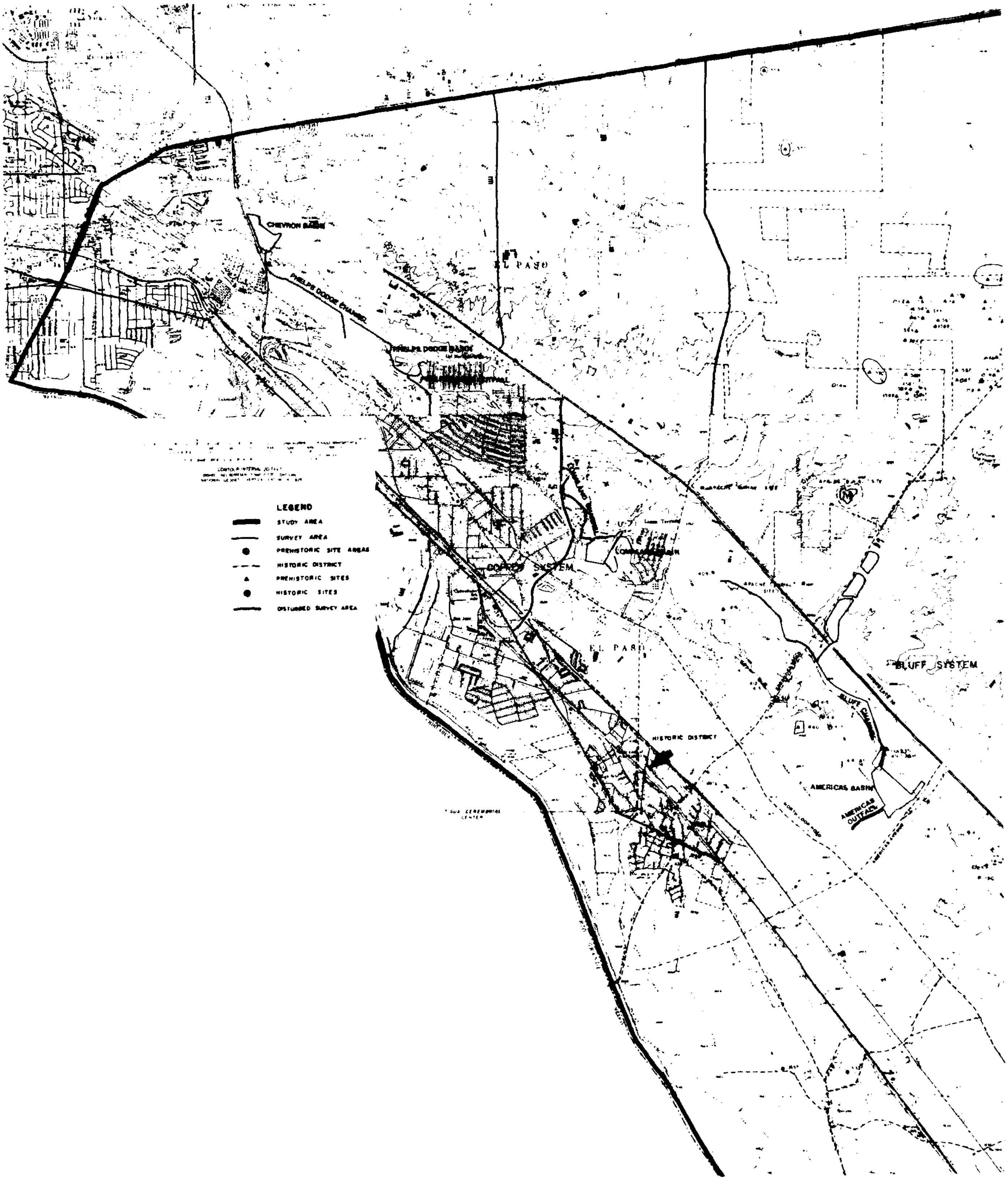
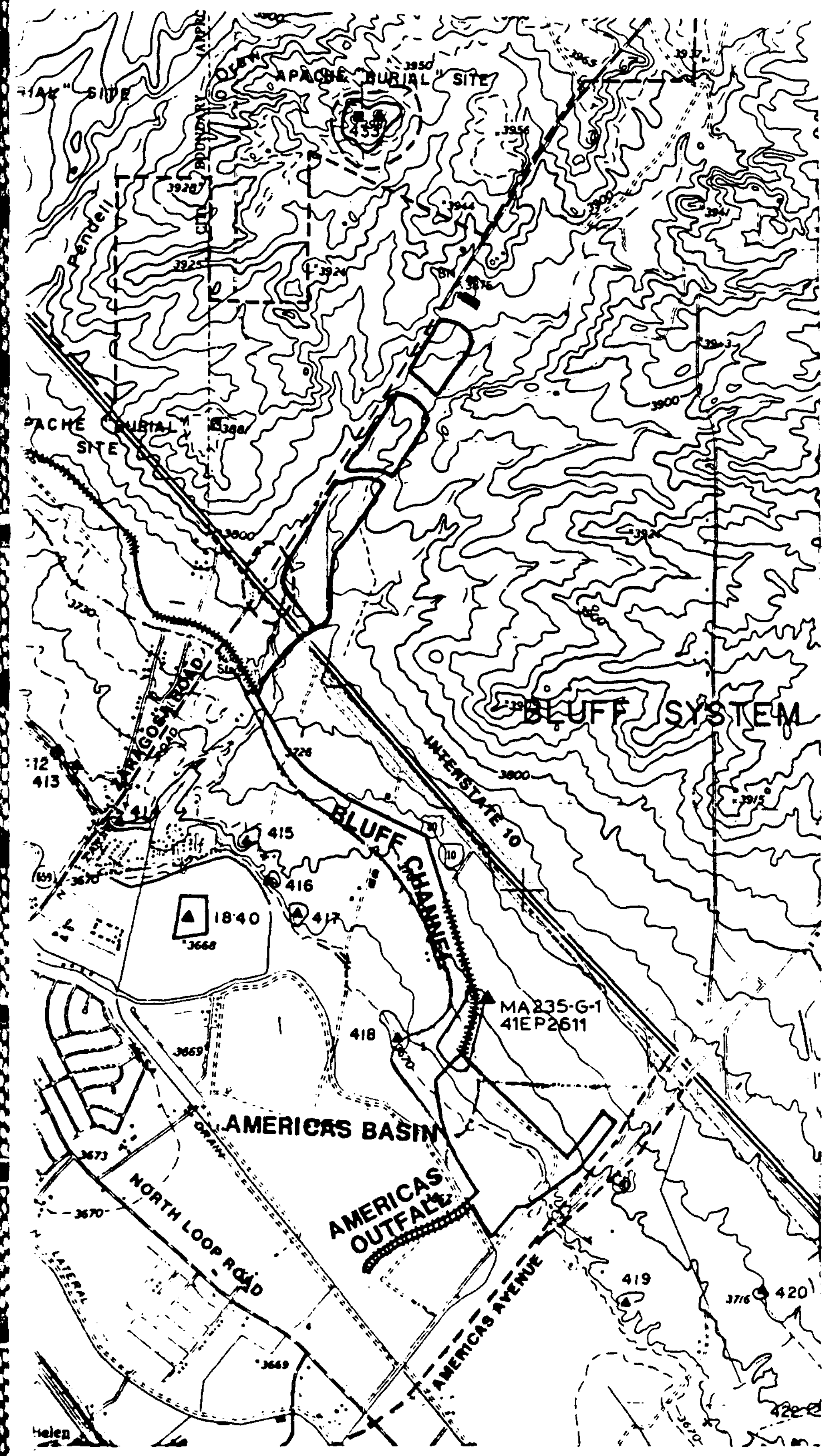


Figure 4.2 Proposed ROW, Lomaland Channel and Basin and Bluff Channel, Americas Basin, and Americas Outfall, El Paso SE Cultural Resource Study, ACOE, 1987.

Bluff Channel,
Paso SE Cultural



Finally, Chevron and Phelps Dodge Basin and Channel were surveyed by Sandy Rayl, U. S. Army Corps of Engineers Archeologist, who reported that the areas are greatly disturbed (Rayl 1987). Much of the Chevron Basin is obscured by landfill and has been paved, is being used for chemical holding ponds, or contains railroad tracks. The Phelps Dodge Channel and Basin are existing features, scheduled for minor modification.

4.3 SURVEY RECORDING PROCEDURES

When the lower Bluff Channel and upper Americas Basin ROW locality was identified as a site, crew members surveyed the area to determine the site limits, marking all artifacts and features with pin flags, including many items extending beyond the ROW. Once the site limits were established, a datum point was selected and marked by a metal rebar and aluminum tag (see Section 4.4 for description). A site map was produced using a tape, transit and base maps (1" = 100') of the area for reference. Mapping included features, artifact concentrations, the locations of collected field specimens, reference points (roads, fences, etc.), and physiographic landforms. Following the testing phase, the positions of test units and backhoe trenches were plotted on the site map. All artifacts within the ROW were analyzed in the field and attributes were recorded on lithic or ceramic artifact inventory forms. Collected artifacts were placed in curation quality self-sealing plastic bags and assigned field specimen numbers.

Due to the large size of the single site recorded for the project and its low artifact density, a 100% inventory within the ROW was made. Eleven areas of artifact exposure corresponding to blowouts or bladed areas with hardpan present were identified. When an artifact was analyzed in the field, it was recorded with reference to the specific area (numbered 1-11) in which it was found and its location was plotted on the site map.

Black-and-white photographs and color slides were taken of general site views. These showed site context and crews performing field tasks.

4.4 EXCAVATION RECORDING PROCEDURES

Site datum location was selected in the area of the greatest number of features and near a terrace edge overlooking lower elevation site areas to the south. This placement on a high point meant that elevation readings did not have to be both added and subtracted to obtain real elevations. A rebar stake set in the ground with a permanent aluminum tag attached served as the datum point. To avoid the possibility of negative elevations the site datum was arbitrarily designated at 10.00 m below an imaginary point in the sky. Actual datum elevation was 3703 feet. Test units were plotted from the main site datum with tape and transit, using the highest corner of each unit as a subdatum point. When test units were located too far from the main datum for a single transit reading, intermediate subdatum points were used to insure accuracy. Test units were lined with plastic prior to backfilling.

All nongeomorphological excavations were performed by hand. Levels were excavated in increments of 10 cm, measured from ground surface at the unit's datum point, which was the highest of the unit's four corners. All soils excavated were screened through one-quarter inch hardware cloth. Plan drawings were produced for each test unit showing the extent and configuration of charcoal staining, fire-cracked rock, and point provenienced artifacts. At least one scaled stratigraphic profile was produced for each unit, recording soil strata and feature characteristics as well as Munsell terminology. Level and strata information was recorded on data forms which specified provenience information, depth of levels, artifacts recovered, level and strata description, and rationale for excavation. When charcoal, pollen, or flotation samples were collected, the locations were plotted on field forms; samples were also recorded on sample forms which specified sample number, sample provenience, associated feature, and comments. All test units and features were photographed in black-and-white and color transparencies.

4.5 ANALYTICAL METHODS

Artifact information required by the scope of work included artifact density and estimated total frequency for each class of artifacts; classes were debitage, chipped stone tools, ground stone tools, and ceramics. Another focus of required artifact analysis was the classification of material culture into temporal types for each surface area or excavated level. Kinds of classification suggested were ceramic types and sorting of lithics by material types. Additionally, the artifact analyses were to address site complexity, depth of cultural deposits, and quantity of artifacts by temporal period for each class. These issues are discussed in Sections 5.3 and 5.4.

The above requirements led to the following kinds of information being recorded during in-field analysis of lithic and ceramic artifacts (the only cultural material present within the ROW). Several fragments of freshwater mussel shell were present in the portion of the site outside the ROW. As the site had experienced extensive mechanical disturbance and deflation, surface artifacts were provenienced to site areas (1-11), defined as blowouts or hardpan areas with artifacts exposed. Also recorded was artifact type, which included debitage (both angular debris and flakes, except for biface flakes, which were recorded separately), cores/hammerstones/worked cobbles, fire-cracked rock, biface flakes, ground stone, retouched flakes, unifaces, points, bifaces, and discoids. Materials type and color were recorded, as well as cortex presence or absence, platform presence or absence, portion, utilization presence or absence, and number of grinding facets.

For ceramics, in addition to site area, types were recorded when known (some of the buff/red/orange wares were of unknown category). Also noted were vessel form, whether or not the sherd was a rim or neck, surface texture and color, paste color, temper, and paint characteristics. As the assemblage overwhelmingly consisted of El Paso Brown and El Paso Polychrome, surface texture, surface color, paste color, and temper were recorded only for those sherds which differed from the normal occurrence of smoothed surfaces, brown surface, dark gray paste, and popcorn (large quartz grains) temper typical of these two ceramic types.

4.6 CREW COMPOSITION AND TIME EXPENDED

The crew consisted of a field director, crew chief, and assistant archaeologist. John C. Acklen served as Principal Investigator and Amy C. Earls as Project Director. Field person-hours, expended over a period of three weeks (including gearup, travel, and actual field time), totalled 207.25, including 48 hours of survey for the Bluff and Lomaland channels and associated basins, and 159.5 hours testing.

5.0 SITE DESCRIPTION

Amy C. Earls and Darryl Newton

The site description includes definition and location of horizontal site boundaries; location, number, and kind of surface features; nature of the artifact assemblage; and density and frequency of artifacts of various types. Also noted are site integrity and postdepositional activities at the site. Several pieces of purple glass were noted, two in the Bluff Channel ROW and one in the Americas Reservoir Basin; as these were in disturbed fill contexts, the items were not formally recorded. The only site located during survey of project lands was 41EP2611 (MA235G-1), a multicomponent ceramic and lithic scatter at the northern edge of the Americas Reservoir Basin and within and west of the ROW as it enters the basin.

5.1 SURFACE DESCRIPTION

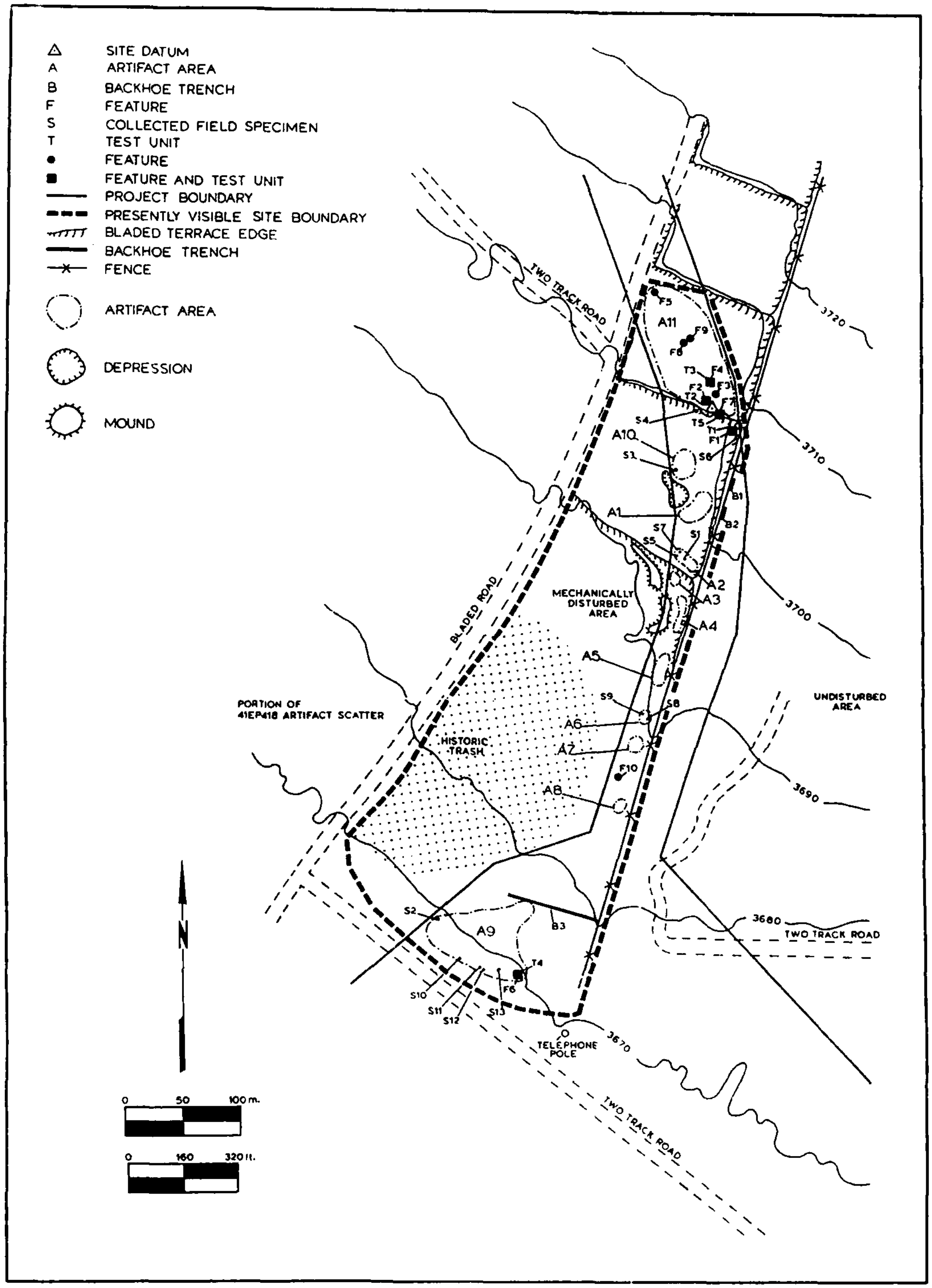
The site is located in southeastern El Paso, 5.2 km northeast of the Rio Grande, 460 m southwest of Gateway Boulevard East along Interstate 10, 1.8 km southeast of Zaragosa Road, and 890 m northwest of Americas Avenue. The site is exposed to the east of the bladed road (Burgundy Drive) that once intersected with Gateway Boulevard and to the west of a fence (Figure 5.1). The site as presently exposed is 375 m north-south by 125 m east-west. The site occurs along a series of six bladed terraces, where mechanical disturbance has removed historical aeolian deposits as well as artifacts, leaving Late Archaic and El Paso phase features and associated artifacts occasionally exposed on hardpan and other surfaces. Figure 5.1 shows the relationship between the ROW (shown as "project boundary" on the map) and site boundaries. All of the site within the ROW west of the fence has been disturbed by blading; the site portion within the ROW east of the fence has been slightly disturbed by a two-track road but is otherwise apparently intact. The site's extent east of the fence is unknown due to the intact aeolian mantle. West of the ROW, the site extends west to the bladed road and is highly disturbed by mechanical stripping.

Bulldozed terraces are numbered in order from north to south. Terraces 1 and 2 contain no surface artifacts or features. Terrace 3 corresponds to Area 11 on Figure 5.1. Terrace 4 contains Feature 1 and Areas 1, 2, and 10. Terrace 5 contains Areas 3-8. Terrace 6 contains Area 9.

5.1.1 Site Boundaries

Site boundaries are based on present exposure of artifacts and features in an area of increased site visibility due to erosion of historical aeolian soils. Vegetated and stabilized deposits east and west of the present site surface may also contain cultural materials beneath the historical aeolian strata. The south end of the site scatter is continuous with the eastern edge of site 41EP418, recorded in 1978. A moderately dense scatter of historical trash lies between major artifact concentrations at each site, with prehistoric materials occurring in low densities among the later trash. The

Figure 5.1 Site 41EP2611 (MA235G-1), El Paso SE Cultural Resource Study, ACOE, 1987.



artifact and feature scatter is essentially continuous between 41EP2611 and 41EP418, but these sites have been separately defined for logistical reasons relating to projected flood control project impacts. Distinction between the two sites was made because of their large size if combined, because 41EP2611 was recorded following major mechanical disturbance and subsequent erosion which took place 3-10 years ago (while 41EP418 was recorded before this disturbance), because of differing analytical approaches of the two surveys, and because only 41EP2611 is located partially within the Bluff Channel ROW. Site 41EP418 now appears larger than its plotted size on the Ysleta quad; it now extends east to the bladed access road, suggesting that erosion has exposed more of the site than was visible in 1978.

Original site forms for 41EP418 were provided by Thomas O'Laughlin of the El Paso Centennial Museum, University of Texas at El Paso (UTEP). Site size at that time was estimated at 14,400 m^2, approximately one-third the size of 41EP2611. The site was recorded as a scattered ceramic and lithic scatter consisting of approximately several hundred sherds and lithics. Artifact density ranged from heavy to light scatters. There is a pile containing approximately 25 pieces of chert debitage and angular debris. Features included a few pieces of burned caliche and limestone, but no charcoal stains. Examination of the area in 1987 showed numerous charcoal stains located on the bladed access road.

Adverse impacts in October 1978, included erosion and plowing, and, judging from the pile of flakes, pothunting. Ms. Doris Kohls, who has lived as a renter on the property for the last 10 years, stated that the previous resident collected artifacts from the area. The site form notes that since the aerial photographs used during the 1978 survey were taken, all land on the other (east) side of the road and to the north of the site for approximately 30 m had been cleared for construction (actually, removal of fill for construction elsewhere). The sketch map shows Le Barron Elementary School and Le Barron Park subdivision, the access road, farmland south and southeast of the site, and plowed areas north and east of the site on the east side of the road. Also shown is the fence east of 41EP2611. The sketch map shows the site extending east of the access road; distances are impossible to determine because the map has no scale and site proportions are not the same as dimensions given in the site description.

Interpretation of the site form and sketch map made in October 1978, and their relationship to present land surfaces in the vicinity of sites 41EP418 and 41EP2611 are as follows. A question of primary importance to interpretation of site 41EP2611 is the size of the plowed land/terrace marked on the original sketch map. Its size relative to the site's size suggests that it refers to only one of the present six terraces bladed into the hill slope. Its orientation relative to site 41EP418 suggests that it is the sixth terrace from the north; that the eastern extension of site 41EP418 east of the access road refers to the light scatter marked "historical trash" on Figure 5.1 and presently containing El Paso Polychrome and El Paso Brown sherds; and that, when site 41EP418 was recorded, only the sixth terrace in the vicinity of Area 9 had been bladed. The present grass and shrub cover in this area suggests that blading here occurred earlier and perhaps was less deep than that on the five terraces to the north. This scenario would agree with informant information that the hill slope was first bladed some 10 years ago, with major fill removal some 4-5 years ago. The first blading, then, would correspond with the "plowing" in the vicinity of 41EP418, and the major fill removal would refer to the deep blading of northern terraces 1-5. The probability of major erosion of the hill slope after 1978 supports the idea that site 41EP418 exposure at present is larger than the originally recorded site size. It may be that the hearths exposed in the road at present (comparable to the Late Archaic ones on site 41EP2611?) have only recently become visible. The situation also suggests that both sites 41EP418 and 41EP2611 involved short-term camping activities that probably occurred over the length of the slope during Late Archaic Period through El Paso times. These remains now are visible only where erosion has removed the historical, century-old aeolian sand deposits that are associated with intense agricultural and overgrazing activity.

The two sites probably reflect the same kinds of activities and are analytically part of the same site. Since, however, 41EP418 was previously recorded and its boundaries are now increased by disturbance, and because this site was outside the scope of the present project, 41EP2611 has been defined as a separate site to accomplish proposed construction related recording and testing tasks.

5.1.2 Surface Features

Ten surface thermal features originally were identified within the ROW; one of these proved to be staining from a mesquite root. Observations on mesquite root evidence in the vicinity of features was recorded to prevent the misidentification of natural features as cultural. Five of the features (Features 1, 2, 4, 6, and 7) exhibited sufficient depth and potential for radiometric and subsistence samples and were therefore selected for testing. These features are discussed in Section 5.2.

Additional thermal features consisting of burned areas of hardpan were observed but not recorded west of the ROW and on the bladed access road. Several of these features occurred on the fourth terrace from the north (west of Area 10) and on the road in the vicinity of the 41EP418 scatter west of the road.

5.2 TEST PIT RESULTS AND BACKHOE EXCAVATION PROCEDURES

5.2.1 Feature 1

Feature 1 is a large charcoal stain measuring 150 cm north-south by 80 cm east-west that is eroding from a machine-created cutbank. This feature was interpreted to represent the remains of a roasting pit or fire pit that had been impacted by construction activities.

Feature location was recorded within a 1 x 2 m unit, but excavation removed only feature contents. This unit, designated Test Unit 1, was positioned to include the entire feature and was aligned with true north. Excavation concentrated in the central portion (Figure 5.2) and removed only feature contents, leaving surrounding sand in place to allow delineation of feature limits. After excavation, the feature measured 160 cm north-south by 60 cm east-west. In order to profile the feature, the stain was bisected along the long axis of the unit, and the portion immediately west of the division line was excavated in three 10 cm levels to a depth of 19-26 cm below ground surface. This section of the feature was designated "A". Due to the westerly slope of the bank, only a small amount of soil had to be taken from the initial three-level excavation to remove this portion of the feature and produce a profile (Figure 5.3). Corner elevations of Section A varied as much as 22 cm because of the slope. Because of downslope sand drift, the actual feature outline in plan view was slightly different from its appearance before excavation. A majority of the western half of the excavation unit proved to be outside the feature area and was left unexcavated. This area was marked by a rodent and erosion caused blurring of charcoal and sand at the feature edges.

The eastern portion of Test Unit 1 was then divided in half at 100 cm north of the south edge of the unit to bisect the east half of the feature and produce a second profile. The northern section (B) was excavated first. Contour excavating was employed to the limits of the stain in four 10 cm levels to a depth of 30 cm below ground surface as measured from the northeast corner, which served as datum. The steep slope in feature Section B produced corner surface elevations varying as much as 18 cm from the higher northeast corner to the lower northwest corner. The steep slope resulted in less than a full 0.1 m^3 volume of soil being removed from each level. Section C, the remaining south portion of the unit, was excavated in four 10 cm levels to a depth of 27-32 cm below ground surface as measured from the northeast corner. Elevations varied 16 cm from the higher northeast corner to the lower southwest corner.

No natural stratigraphy was observed other than the top 10 cm of the drift sand. Hearth fill (Stratum 1) ranged from loose to slightly compact dark gray sand (Munsell 10YR 4/1) to very dark gray sand (Munsell 10YR 3/1). Surrounding soil ranged from pale brown (Munsell 10YR 6/3) (Stratum 2) to yellowish brown sand (Munsell 10YR 5/4) (Stratum 3), being loose to slightly compact in consistency (see Figure 5.3).

When completely excavated the feature proved to be a semioval, basin shaped pit, 33 cm deep and filled with charcoal and stained soil. Much of the western half of the pit had been bladed and eroded away. Two refitting pieces of utilized, red chert angular debris were recovered from Level 1 of Section A.

Thirteen charcoal samples, three pollen samples, and three flotation samples were removed from Feature 1 (Table 5.1). In addition, a sherd was found on the surface of the fence bank, just south of the feature. The sherd, two of the C-14 samples, three of the pollen samples, and two of the flotation samples from the feature were submitted to laboratories for analysis. Results are discussed below.

Figure 5.2 Feature 1 Plan View, El Paso SE Cultural Resource Study, ACOE, 1987.

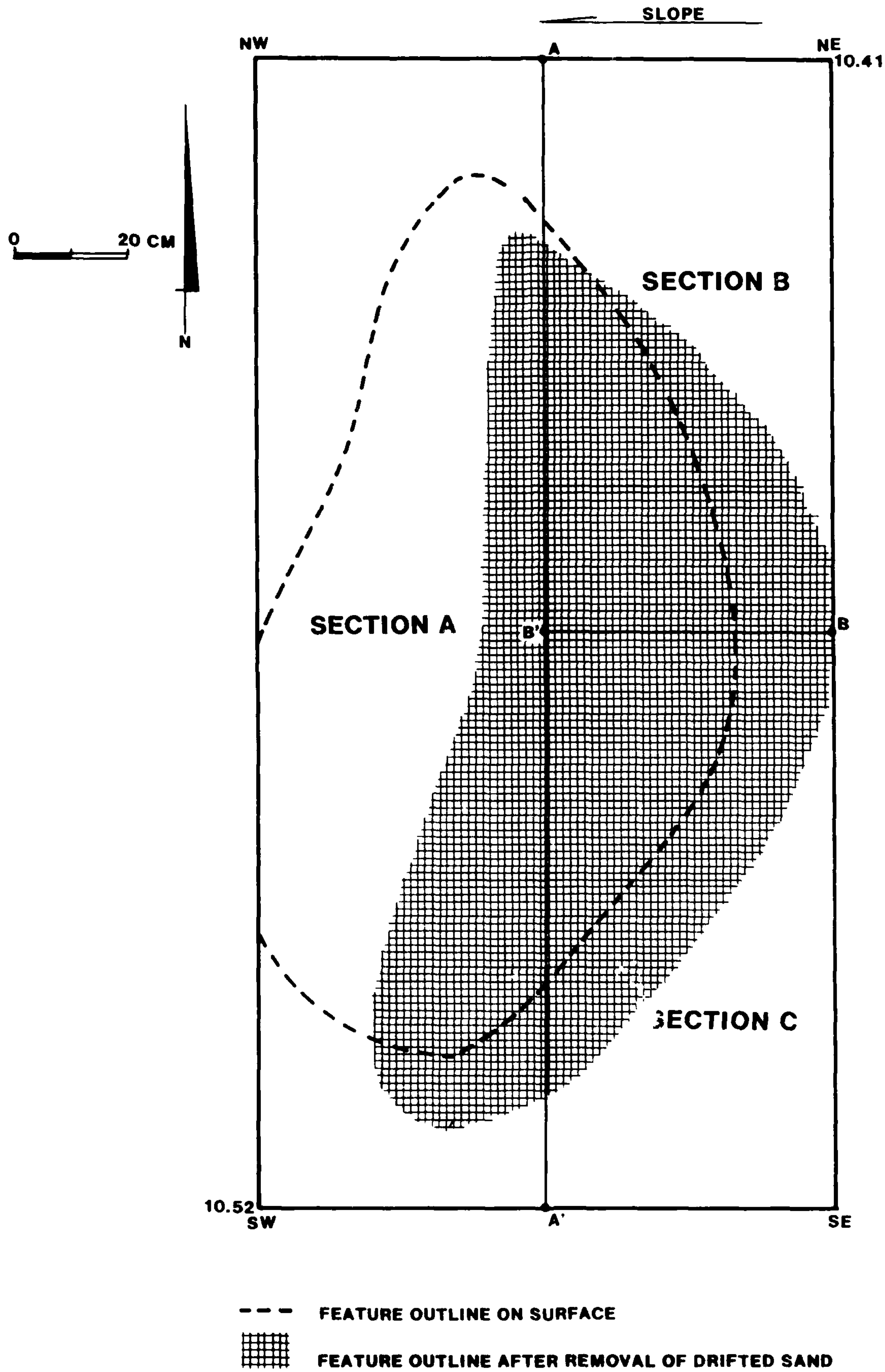
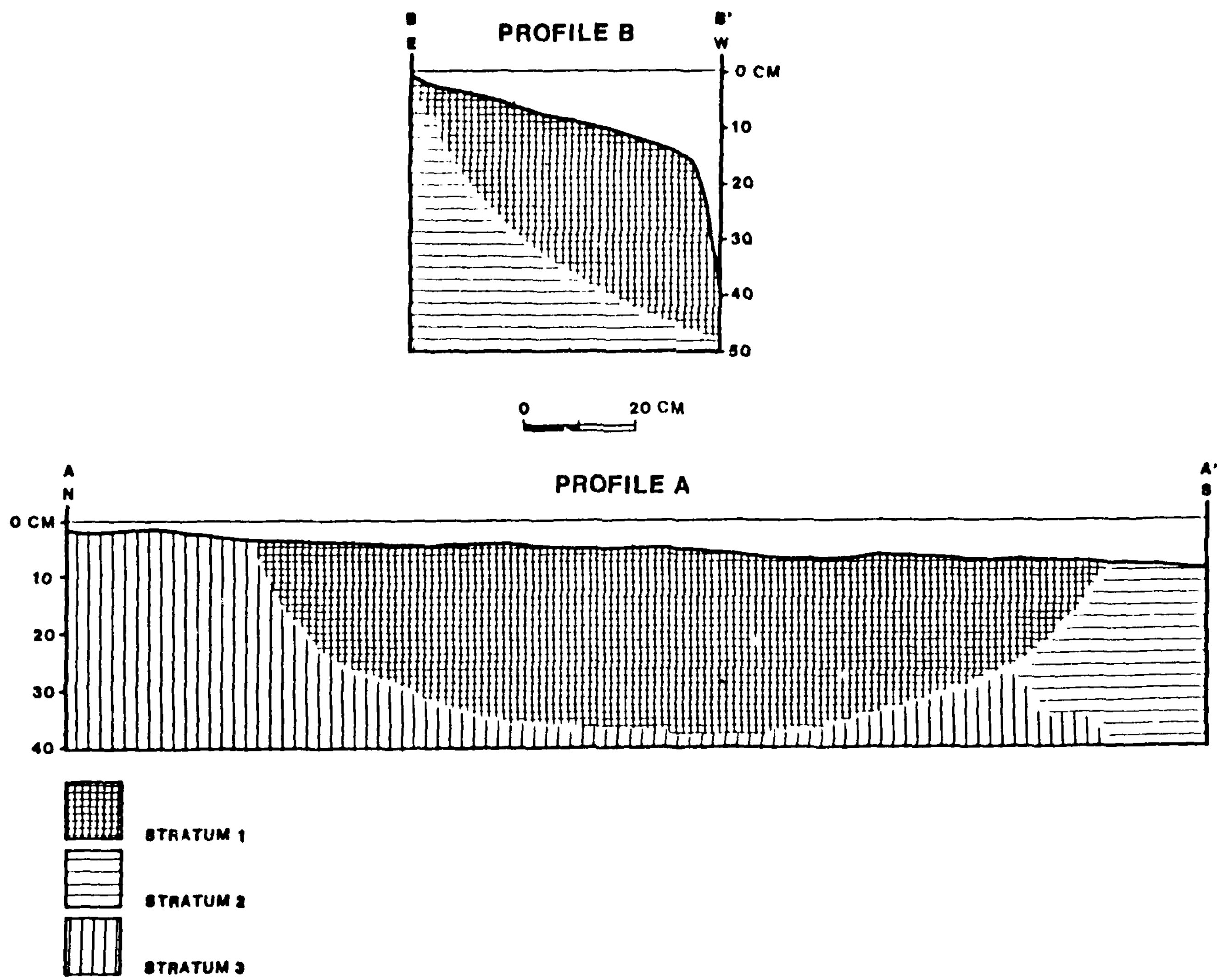


Figure 5.3 Feature 1, North-South (A) and East-West (B) Central Axis Profiles, El Paso SE Cultural Resource Study, ACOE, 1987.



Uncorrected dates for the top and bottom levels of the feature were 3500 ± 250 B. P. (University of Texas, Austin, [UT] number 5737) for Level 1 (1-10 cm below surface) and 3680 ± 60 B. P. (UT number 5738) for Level 4 (30-33 cm below surface). The laboratory used the 5568 radiocarbon half-life figure. Radiocarbon specimen data sheets are included as Appendix E.

Table 5.1 Samples Recovered from 41EP2611, El Paso SE Cultural Resource Study, ACOE, 1987.

Sample Number	Test Unit	Level	Sample	Feature	Date
1	1	1A	Charcoal	1	5/17/87
2	1	1B	Charcoal	1	5/17/87
3A	1	1C	Charcoal	1	5/19/87
3B	1	4C	Pollen	1	5/19/87
4	1	3B	Pollen	1	5/18/87
5	1	3B	Charcoal	1	5/18/87
6	1	3C	Charcoal	1	5/19/87
7	1	3B	Flotation	1	5/18/87
8	1	3C	Charcoal	1	5/19/87
9	1	3A	Charcoal	1	5/18/87
10	1	2A	Charcoal	1	5/17/87
11	1	2A	Charcoal	1	5/17/87
12	1	2A	Charcoal	1	5/18/87
13	1	2B	Flotation	1	5/18/87
14	1	2C	Charcoal	1	5/19/87
15	1	2B	Pollen	1	5/18/87
16	1	2B	Flotation	1	5/18/87
17	1	4C	Charcoal	1	5/19/87
18	1	4C	Charcoal	1	5/19/87
19	2	2	Charcoal	2	5/18/87
20	4	Surface	Charcoal	6	5/19/87
21	4	2	Flotation	6	5/19/87
22	3	Surface	Charcoal	4	5/18/87
23	5	1	Flotation	7	5/19/87

Tree-ring calibrations were used to correct the dates for fluctuations in C-14 level through time. Dates were corrected following Ralph et al. (1974) and Long and Rippeteau (1974). Once dates were received, the 5568 half-life dates were converted to the 5730 half-life by multiplying by 1.030. The tables in Ralph et al. (1974) were consulted to produce tree ring corrected midpoints or ranges of 2020-2040 B. C. ± 260 (Level 1) and 2150 B. C. ± 70 (Level 4). Taking into account standard deviation, the range for the Level 1 date would be 2300-1760 B. C. and for the Level 4 date would be 2220-2080 B. C.

The average unweighted midpoint date for the feature would be 2110 B. C. Only two dates are involved, however. The weighted corrected average on the two dates (weighted for the smaller standard deviation) is 2140 B. C. ± 68.

The El Paso Brown sherd from the fence bank just south of this feature was submitted for petrographic analysis (Appendix C). Results show that it, like two other sherds of this type from the site and 36 unspecified brownware (El Paso Brown or El Paso Polychrome unpainted body sherds) from the Santa Teresa, New Mexico, area west of El Paso (discussed in Section 3.1; O'Leary 1987), was tempered with monzonite and has clay matrix characteristics similar to other analyzed sherds from the area.

Because of the sandy matrix and consequent leaching of deposits, pollen preservation was poor (Appendix A). It was impressive that any pollen was recovered at all. All levels contained Cheno-Am, pine, and indeterminate (eroded) taxa. Levels 2 and 3 contained Mormon tea-type pollen, as well as high spine Asteraceae. Levels 3 and 4 contained *Poaceae* and *Opuntia*. Level 4 contained modern oak.

All pollen grains identified except *Opuntia* represent taxa frequently encountered in the Southwest as background taxa. The *Opuntia* probably represents the subgenera *Cylindropuntia* (cholla) or *Corynopuntia* (dog cholla), which produce heavy, large pollen grains attractive to animals. The presence of cholla pollen indicates that a good many of these plants must have been present in the site area. These taxa probably signal the presence of this plant in the immediate site area. None of the taxa represented in samples from this feature are different from those presently available in the site area; thus, there are no indications of environmental change since site occupation.

Flotation results from Levels 2 and 3 produced three seeds, all unburned (Appendix B). The upper level contained scorpionweed and a charred seed of an unknown annual weed, and the lower level produced one seed of beeweed. Scorpionweed is of negligible economic utility and almost certainly represents a modern contaminant. Beeweed is a plant frequently utilized by prehistoric inhabitants of the Southwest, but since the seed was unburned and occurs within easy gathering range of the site, it cannot be linked reliably to the prehistoric occupation.

Examination of charcoal was more productive. All charcoal from Levels 2 and 3 of the feature was *Prosopis* (mesquite). Mesquite, a very dense wood, is the logical fuel and manufacturing material for occupants of sparsely wooded areas of southern New Mexico and west Texas.

5.2.2 Feature 2

Feature 2 is a discrete cluster of 47 fire-cracked limestone rocks. The feature is approximately 70 cm north-south by 60 cm east-west and is roughly semicircular in shape. No charcoal staining was visible on the surface. Clearly, Feature 2 is a remnant of a badly deflated hearth. It is possible the limestone rocks could have served as boiling stones or in some other cooking capacity.

A 1 x 1 m test unit, designated Test Unit 2, was positioned to include the entire feature; this unit was aligned with true north. In order to best produce a feature profile the unit was bisected centrally on its east-west axis (Figure 5.4). The southern half of the unit was excavated to sterile soil in four 10 cm levels to a depth of 40 cm below ground surface. After the north wall of the south half of the excavation had been profiled the northern half of the test unit was excavated to sterile soil in three 10 cm levels to a depth of 30 cm below ground surface. Charcoal particles did not appear below this level so it is assumed the feature extended no deeper than Level 3.

Three strata were identified (Figure 5.5). Stratum 1 is a pinkish gray (Munsell 7.5YR 6/2) coarse grain aeolian sand containing fine hair roots and one area of rodent disturbance. Stratum 2 is identically the same matrix as described for Stratum 1 except for grayer color (Munsell 7.5YR 6/2). This basin shaped, gray soil stratum appears below the limestone cluster and may be interpreted as heat-affected sand. Stratum 3 is a light brown (Munsell 7.5YR 6/4) fine grain aeolian sand containing pea gravel, hair roots, and a single area of rodent disturbance. Random charcoal particles were collected from Levels 2 and 3 of the northern half of the unit. A small circular stain (2-4 cm in diameter) appeared beneath the limestone cluster in the northern half of the test unit, extending to a depth of approximately 28 cm below ground surface. A total of 47 fire-cracked limestone rocks and one fire-cracked quartzite rock was counted for the entire unit.

A C-14 sample was gathered from Level 2 of the feature, at 10-20 cm below surface. This sample (UT number 5737) dated 3570 ± 50 B. P. (uncorrected). The tree ring corrected midpoint date of 2080 B. C. ± 60, producing a range of 2140-2020 B. C., indicates a Late Archaic use of the hearth.

5.2.3 Feature 3

Feature 3 is an ash and charcoal stain on the dune hardpan surface. The feature measures 67 cm north-south by 64 cm east-west. No mesquite root impressions were visible in the feature vicinity. No artifacts were visible on the surface.

5.2.4 Feature 4

Feature 4 is an irregular charcoal stain measuring approximately 55 cm east-west by 50 cm north-south. It occurs on a compact hardpan surface that has been exposed by machine blading and wind erosion. Feature 4 is interpreted as being a badly deflated hearth which could have been partially destroyed by machine topsoil removal.

A 1 x 1 m test unit, designated Test Unit 3, was positioned to include the entire feature; this unit was aligned with true north. In order to best produce a feature profile, the unit was bisected centrally on its east-west

Figure 5.4 Feature 2 Plan View, El Paso SE Cultural Resource Study, ACOE, 1987.

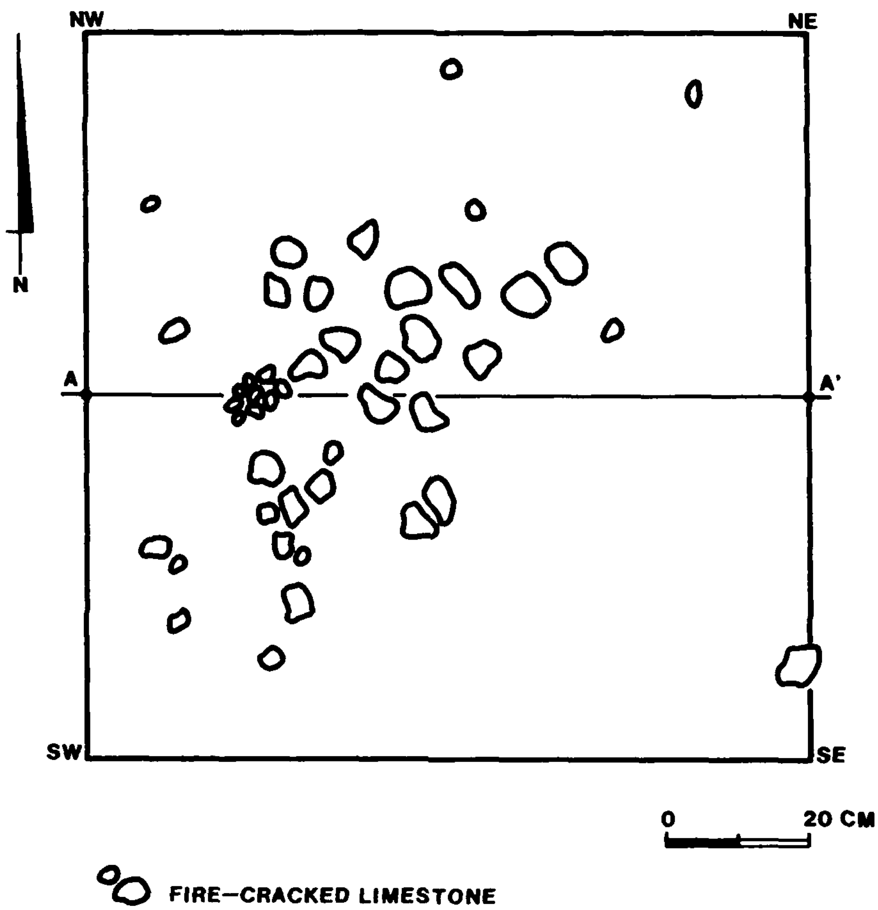
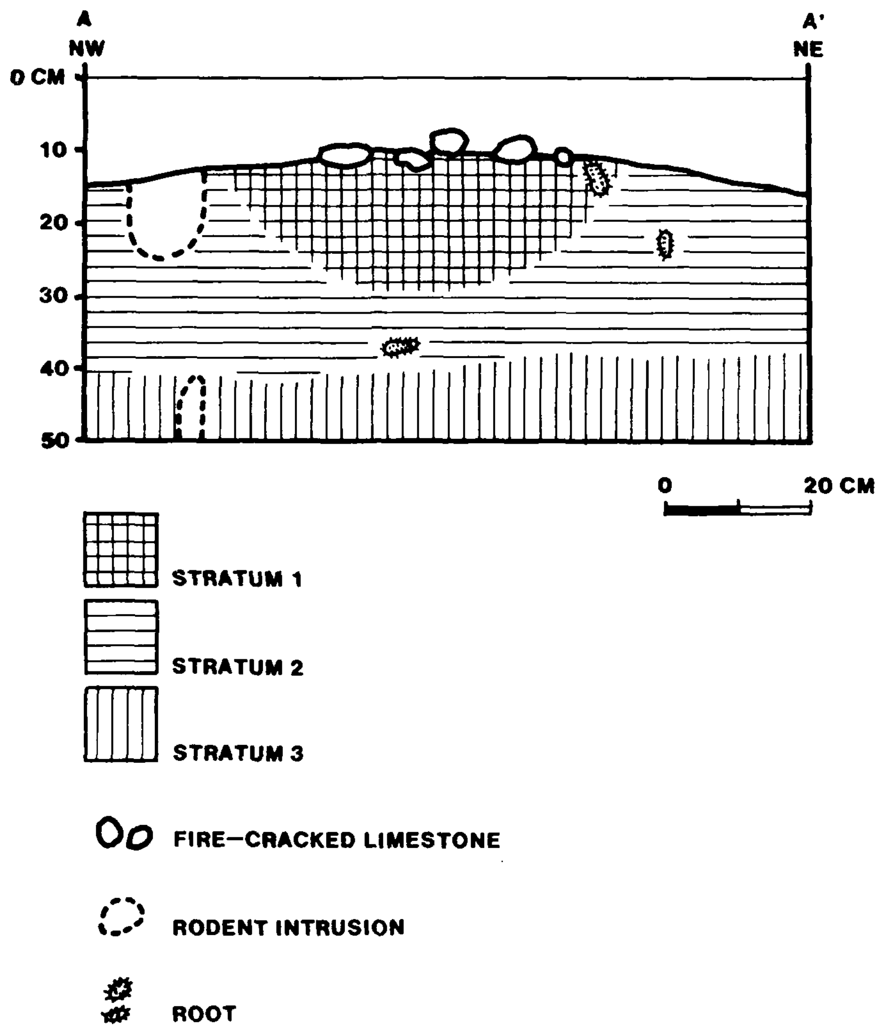


Figure 5.5 Feature 2 Central Axis Profile, El Paso SE Cultural Resource Study, ACOE, 1987.



axis (Figure 5.6). The southern half of the unit was excavated to sterile soil in one level to a depth of 10 cm below ground surface. The feature proved to be completely surficial, the stained soil being only a hard packed crust no more than 1 mm in depth. One C-14 sample was collected; when cleaned, it proved to be too small to submit for dating.

Three strata were identified (Figure 5.7). Stratum 1 was recorded as the layer of stained crust, a compact dark gray sand (Munsell 2.5YR 4/0) that was subsequently collected for possible radiometric analysis. Stratum 2, the hardpan below the stained crust, was a light brown sand (Munsell 7.5YR 6/4) with calcium carbonate that had to be excavated with a pick. Stratum 3, a compact brown sand (Munsell 7.5YR 5/4) appeared as an inclusion in the unit's north wall profile. It probably represents a fissure in the hardpan surface that had been filled by aeolian sands. A particle of obsidian was collected from the feature's surface but appeared to be a natural pebble and not an artifact.

5.2.5 Feature 5

Feature 5 is an ash and charcoal stain on dune hardpan. It measures 52 cm east-northeast to west-southwest by 30 cm north-northwest to south-southeast. Two imprints of mesquite roots cross the center of the feature. No artifacts are visible in the vicinity of the feature. Function was probably an overnight camp fire.

5.2.6 Feature 6

Feature 6 is an irregular stain with charcoal particles, measuring 120 cm east-west by 60 cm north-south, which occurs on a bladed, wind eroded hardpan surface. The single feature is composed of two stained areas. Seven sandstone rocks, two quartzite rocks, and two limestone rocks, all fire-cracked, appear on the surface in association with the feature as well as three unaltered vesicular basalt rocks, a siltstone flake, and a ceramic sherd not definitely associated with the staining. These rocks may have been used in a stone boiling process or for other cooking purposes.

A 1 x 2 m test unit, designated Test Unit 4, was positioned to include the entire feature; this unit was aligned with true north, the long axis running east-west. In order to best produce a feature profile, the unit was bisected east-west at 40 cm north of the south edge of the unit (Figure 5.8). The central half of the southern portion of the unit (from 50-150 cm east of the west edge of the unit and 0-40 cm north of the south edge), corresponding to the darkest stain, was excavated first. This unit was excavated to sterile soil in two 10 cm levels to a depth of 20 cm below ground surface. To check the depth of staining to the east, an additional unit (from 150-200 cm east of the west edge and 40 cm north of the south edge) was separately excavated in a single level to a depth of 10 cm below ground surface.

Figure 5.6 Feature 4 Plan View, El Paso SE Cultural Resource Study, ACOE, 1987.

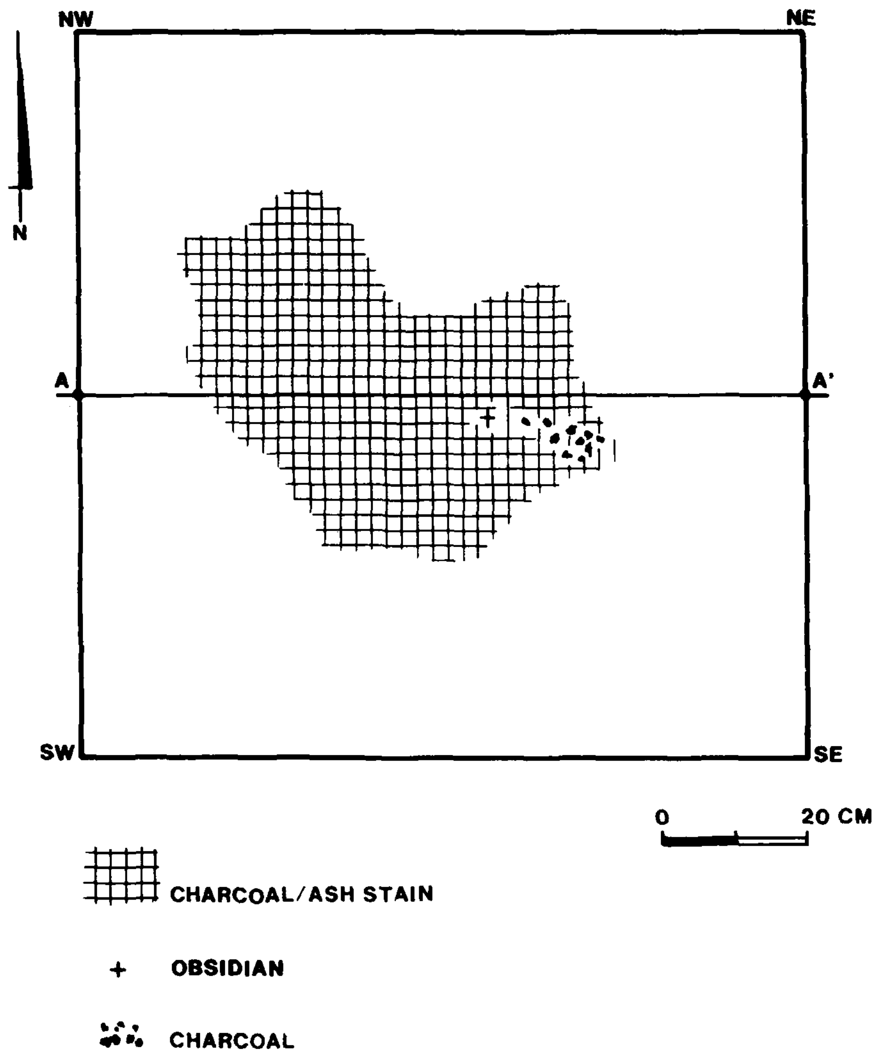


Figure 5.7 Feature 4, Central Axis Profile, El Paso SE Cultural Resource Study, ACOE, 1987.

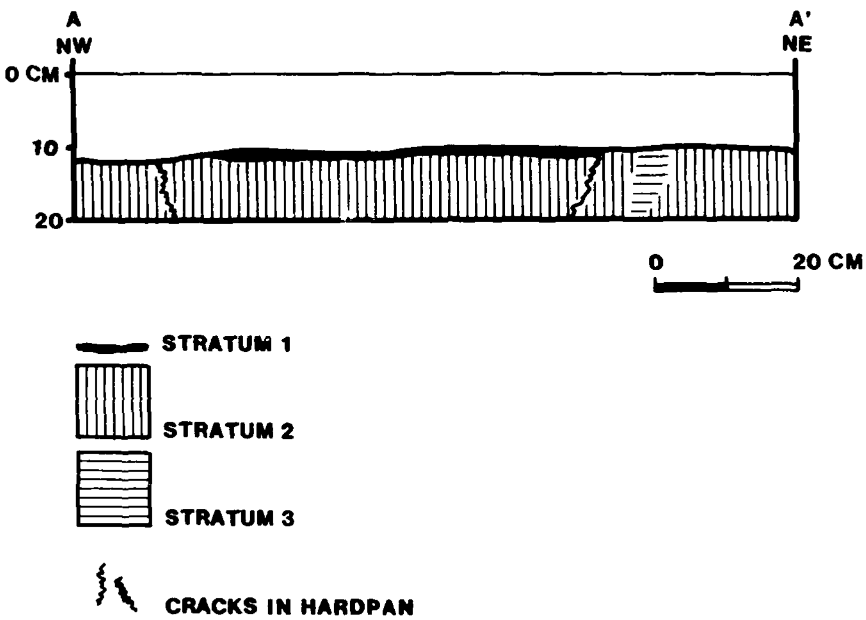
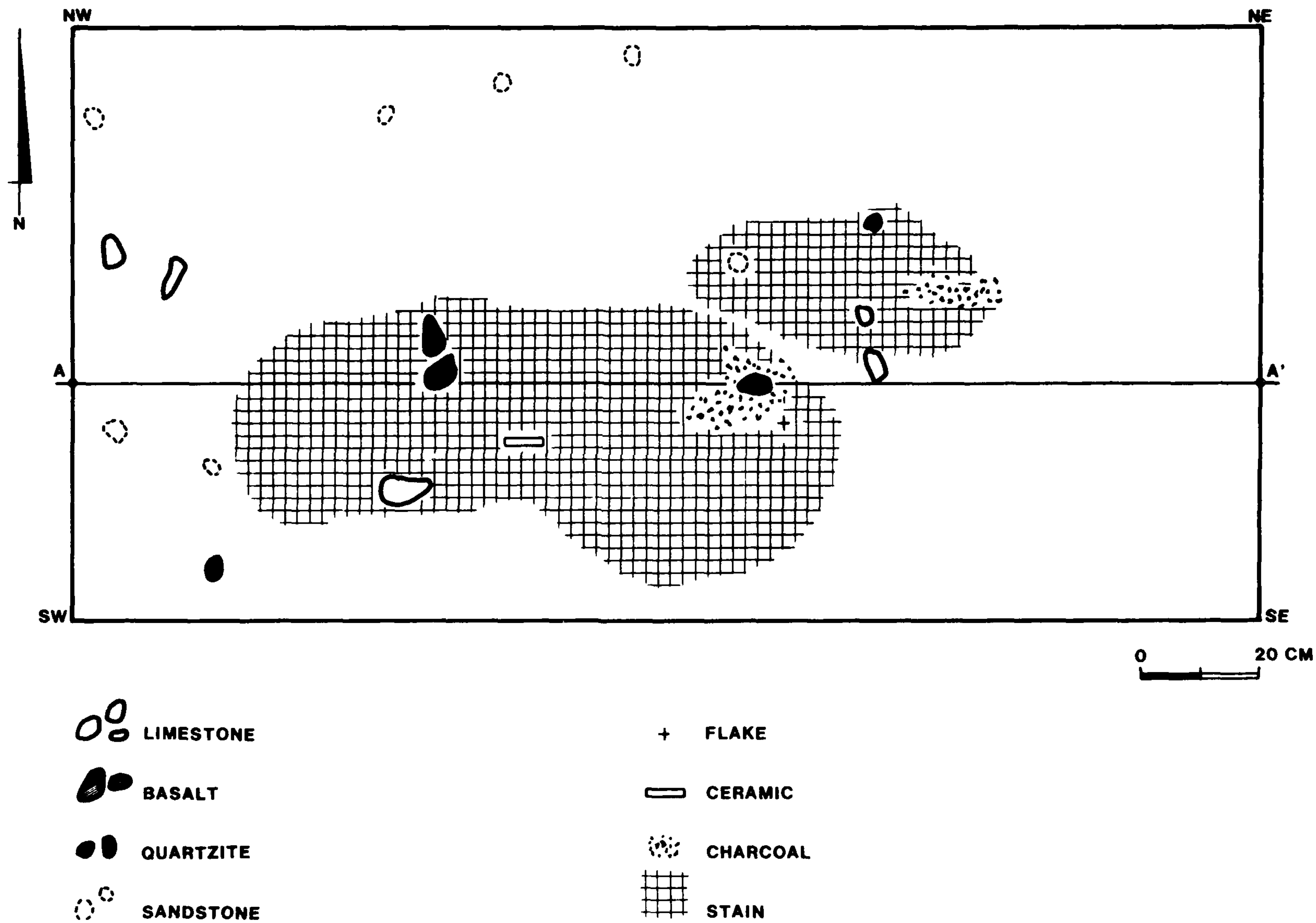


Figure 5.8 Feature 6 Plan View, El Paso SE Cultural Resource Study, ACOE, 1987.



Staining proved to extend no more than 5 cm below ground surface with no definable pit shape. Much of the staining was only surficial, probably due to scattering of the hearth fill by the wind.

Two strata were identified (Figure 5.9). Stratum 1 was recorded as the stained soil, a compact dark gray sand (Munsell 5YR 4/1). Stratum 2 was compact brown sand (Munsell 7.5YR 5/4) with deteriorating roots, lag gravel, and traces of clay present. Several rodent disturbances were noted. Two charcoal laden soil samples and part of a snail shell were collected from Level 1.

The feature produced a charcoal sample from the surface and a flotation sample from Level 2. The charcoal, from the south half of the feature's surface, dated 660 $\pm$ 60 B. P. (UT number 5740). The tree ring corrected date was A. D. 1290-1260 $\pm$ 70 indicating a corrected range of A. D. 1190-1360. This date confirms El Paso phase use of the hearth.

A flotation sample from Level 2 of Feature 6 produced seeds of pigweed, pricklypear, purslane, and seepweed. These unburned seeds are probably contaminants, rather than reflecting prehistoric use. Only the pricklypear seed was burned. This genus grows in the site vicinity and is the only seed reliably related to the prehistoric occupation because of its burned condition. Charred cactus seeds have been recorded at other Chihuahuan Desert sites (see Appendix B).

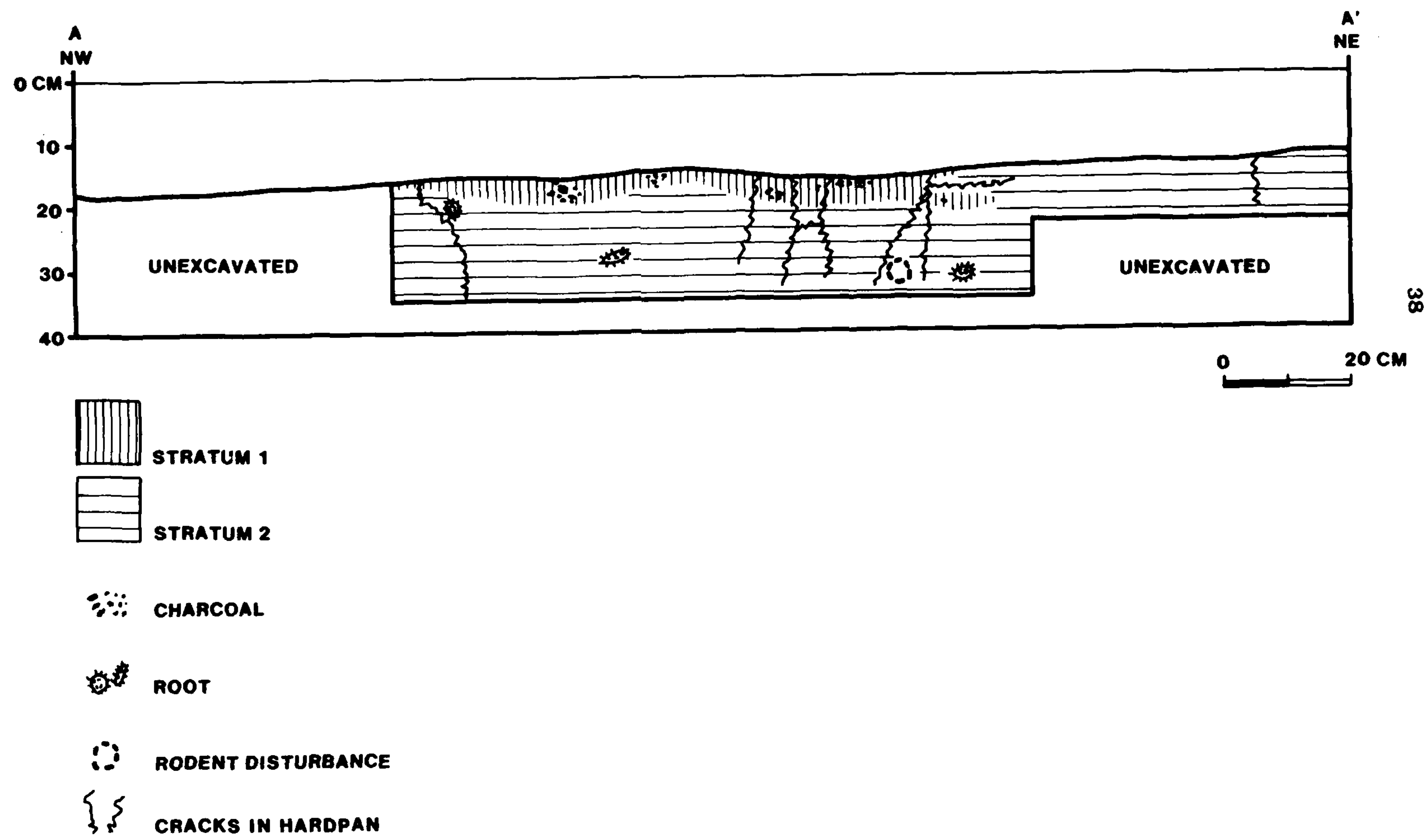
Examined charcoal from Level 2 of Feature 6 was composed of 80% mesquite and 20% saltbush/greasewood. Cacti and other perennial species such as mesquite are more common in flotation assemblages of southern New Mexico and west Texas sites than annual weeds, which are more common in the northern Rio Grande or on the Colorado Plateau.

An El Paso Polychrome sherd was recovered from the surface of the feature. The interior was well smoothed, with fine scoring marks. This sherd was submitted for petrographic analysis. The sherd was tempered with crushed monzonite, the same tempering agent used for the three El Paso Brown samples (Appendix C). In fact, the temper and clay matrix characteristics of the two ceramic types are so similar that they appear to have derived from the same manufacturing source. Monzonite is not locally available in the site vicinity, but outcrops of this igneous rock may occur in the Organ Mountains 60-65 km to the north.

5.2.7 Feature 7

Feature 7 is an area of stained soil extending out past the edge of a machine cut terrace; the stained soil, being slightly more compact than the surrounding matrix, appears to have been more resistant to erosion than adjacent surfaces on the terrace edge. The feature appeared to be the remains of a hearth that had been largely destroyed by construction activities and wind erosion.

Figure 5.9 Feature 6 Central Axis Profile, El Paso SE Cultural Resource Study, ACOE, 1987.



A 1 x 1 m test unit, designated Test Unit 5, was positioned to include the entire feature, the southern side of the unit extending past the terrace edge to the eroding slope (Figure 5.10). The unit was aligned along a north-east-southwest axis. The southern edge of the feature was troweled smooth vertically along a partially curved line to produce a profile wall 1 m long east-west by 20 cm deep below ground surface. A 10 cm level was excavated from the top of the entire feature to produce a second profile wall 90 cm north-south by 10 cm deep below ground surface. A basin shaped, ash filled pit, dug approximately 14 cm into the hardpan, was indicated from the profiles. A charcoal sample was collected from Level 1; when cleaned, it proved to be too small to submit for C-14 dating.

Three strata were identified (Figure 5.11). Stratum 1, the ash stained matrix, was recorded as a very compact grayish brown soil (Munsell 10YR 5/2) with charcoal flecks and rodent disturbance. Stratum 2 was a yellowish brown sandy soil (Munsell 10YR 5/4) containing charcoal flecks. Stratum 3 was a very compact light yellowish brown soil (Munsell 10YR 6/4). A sample of the stained soil Stratum 1 was taken for flotation. No artifacts were recovered.

A flotation sample from Level 1 produced two seed taxa, one of prickly-pear and three of purslane, both unburned (Appendix B). Although both taxa were used economically by prehistoric occupants of the Southwest, the taxa from this sample appear to be contaminants due to their unburned condition and their availability in the site vicinity. Charcoal from the feature was predominantly mesquite, with one small piece of an undetermined nonconifer other than mesquite.

5.2.8 Feature 8

Feature 8 is another ash and charcoal stain on dune hardpan. The feature measures 68 cm south-southwest to north-northeast by 38 cm west-northwest to east-southeast. Neither artifacts nor mesquite root impressions were present in the feature vicinity.

5.2.9 Feature 9

Finally, Feature 9 is another ash and charcoal stain on dune hardpan. The feature measures 30 cm north-south by 37 cm east-west. Mesquite root impressions occur west of the feature. No artifacts are present in the feature vicinity.

5.2.10 Backhoe Excavation Procedures

Three backhoe trenches were excavated when the geomorphological specialists were present. Trench 3 (Figure 5.12) was the deepest and longest trench; it was approximately 220 feet long and 4-3/4 feet deep. This trench was placed from the fence marking the eastern edge of mechanical disturbance and deflation to approximately the center of the site along the northern edge of Area 9. The trench was placed to obtain a cross section of site substrate in

Figure 5.10 Feature 7 Plan View, El Paso SE Cultural Resource Study, ACOE, 1987.

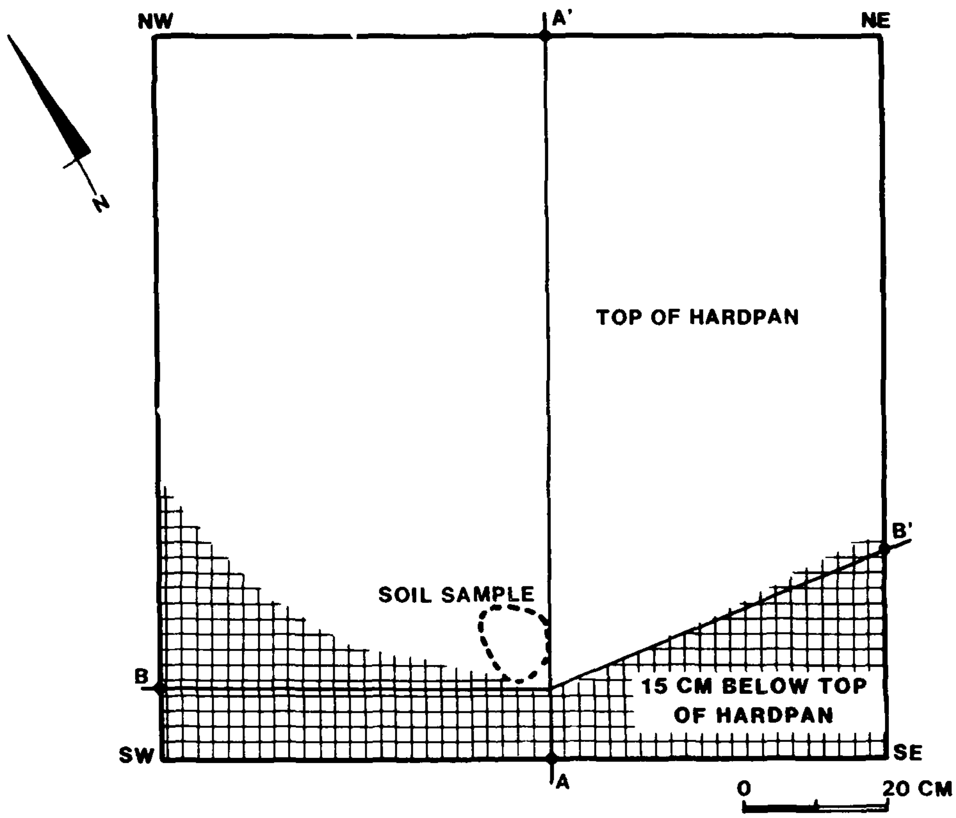


Figure 5.11 Feature 7 North-South (A) and East-West (B) Profiles, El Paso SE Cultural Resource Study, ACOE, 1987.

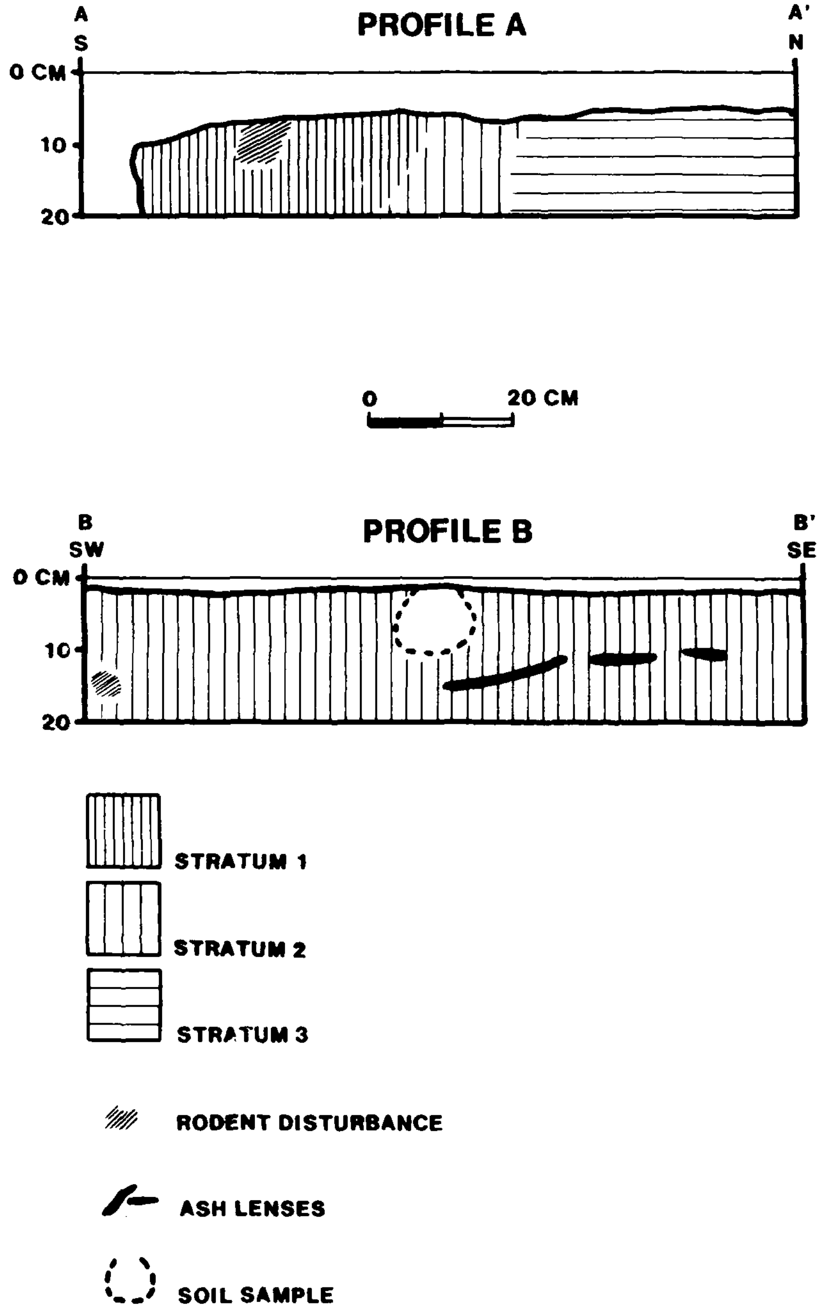


Figure 5.12 Backhoe Trench 3, North of Area 9, El Paso SE Cultural Resource Study, ACOE, 1987.

an area that was less disturbed than the northern portions of the site. The trench was placed from the fence area to near the western edge of the ROW in order to parallel the long axis of Area 9. Area 9, thought to be the most recent area of the site, based on the presence of El Paso Polychrome and Chupadero Black-on-white sherds, was stabilized by vegetation, in contrast to the northern, mechanically disturbed terraces on the site. Trenches 1 and 2 were placed on the eastern side of the fence in deposits that have not experienced blading because of the presence of the fence. These deposits are stabilized by vegetation and were thought likely areas of in situ cultural materials. Trench 1 (Figure 5.13), to the north, was approximately 12 feet long and nearly six feet deep and was located east of Areas 1 and 10. Trench 2, to the south, was approximately eight feet long and five feet deep. Actual elevations of backhoe trenches (numbered 1-3 from north to south) were 3703 feet for trenches 1 and 2, 3685 feet for Trench 3, east end, and 3680 feet for Trench 3, west end. Description of soils and geomorphic discussions are presented in Appendix D. Backhoe trenches and test units were backfilled after excavation and marked at one corner with a metal rebar stake.

Figure 5.13 Backhoe Trenches 1-2 After Backfilling; Note Vegetation East of the Fence and Bladed Site Area West of the Fence, El Paso SE Cultural Resource Study, ACOE, 1987.

The geomorphological analysis addressed the relationship of various geomorphological processes at the site and the relationship of archaeological features to site sedimentology. The analysis was based on field measurement and observations of stratigraphic relationships and soil color, laboratory grain size analysis, and literature review.

5.3 ARTIFACT ANALYSIS

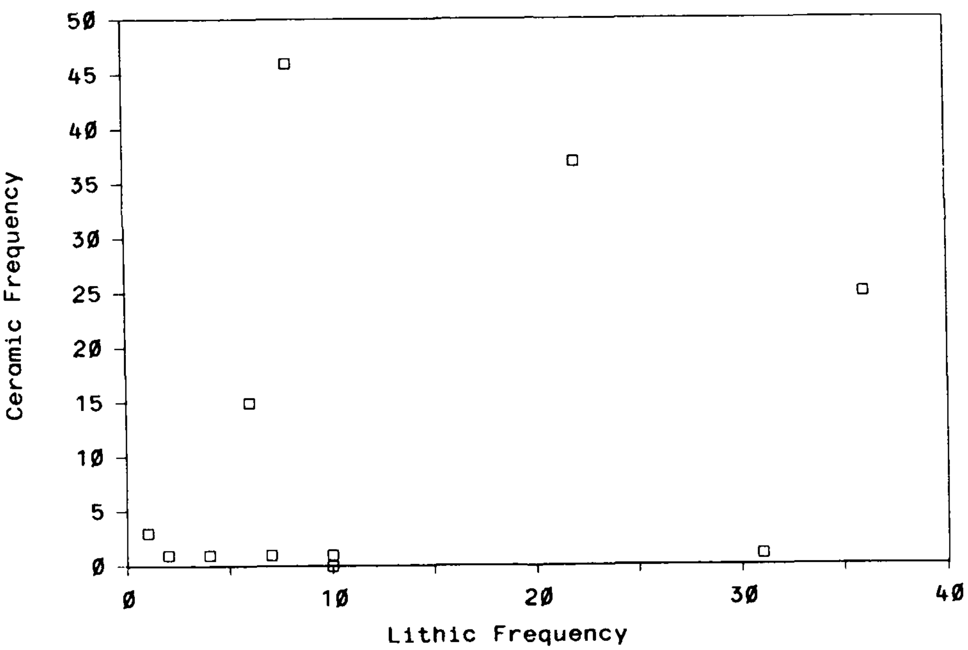
The artifact analysis deals with ceramic and lithic artifacts. Artifact types are discussed in regards to relative dates by site provenience and attribute variability is summarized. Artifact types from 41EP418 are briefly described and compared with the 41EP2611 assemblage.

The only surface artifacts collected from 41EP2611 were a projectile point and 13 sherds for petrographic analysis. Five other items were collected during the course of excavation.

The point was from Area 10 and the 12 sherds from various site areas. The point was collected for type identification and preservation. Twelve of the thirteen sherds were submitted for petrographic analysis; two of these were rim sherds and were illustrated for comparative purposes. Excavated artifacts were a flake and sherd from Feature 6 and a tiny noncultural obsidian pebble from Feature 4.

In a number of cases, frequencies of lithics and ceramics are inversely related (Figure 5.14). Lithics outnumber ceramics by a ratio of 10 to 1 or more in Areas 3, 4, and 11 (Table 5.2). On the other hand, ceramics in Area 9 outnumber lithics by more than 5 to 1. Where ceramic frequencies are low, as in Areas 1, 3, 4, 7, 8, 10, and 11, the remaining artifact assemblage may date primarily to the Archaic period. Because of extensive deflation and the lack of datable obsidian, further relative dating is difficult. The two hearths, Feature 1 (2020-2040 B. C.±260 and 2150 B. C.±70) and Feature 2 (2080 B. C.±60), dating to the Archaic are located in Area 11 and between Areas 10 and 11 at the northern end of the site. The projectile point found in Area 10 probably dates to the Late Archaic or early ceramic periods; it will be discussed later.

Figure 5.14 Lithic and Ceramic Frequencies 41EP2611, for Areas 1-11, El Paso SE Cultural Resource Study, ACOE, 1987.



Artifacts collected from site 41EP418, west of the Bluff Channel site, were two smudged-indented corrugated bowl sherds, a handle from an El Paso Polychrome pitcher, a Chupadero Black-on-white jar sherd, a Carretas Polychrome jar sherd, and a possible Casas Grandes Plainware jar rim. Also present was Babicora Polychrome. Ceramics were predominantly El Paso Polychrome body and rim sherds. Paint on many was vivid and indicated very little erosion had taken place. Lithics included obsidian, chert and rhyolite flakes, a mano fragment, a small ground stone fragment, and one chert core.

Ceramics at 41EP2611, on the other hand, did not include corrugated forms or polychromes other than El Paso Polychrome. There were a number of plain brownware types, however, other than El Paso Brown. The lithic assemblage at site 41EP2611 was predominantly chert, with only a tiny particle of obsidian. Cores were quite frequent at the site. Superficially, both lithic patterns seem to contrast with those noted at 41EP418, although this contrast cannot be stated with certainty since no systematic recording or analysis was performed at site 41EP418. The 41EP2611 assemblage is discussed in greater detail below.

Table 5.2 Artifact Frequencies by Site Area, El Paso SE Cultural Resource Study, ACOE, 1987.

Area	Lithic Frequency	Ceramic Frequency	Lithic/Ceramic Ratio
1	7	1	7.00
2	22	37	0.59
3	10	0	--
4	10	1	10.00
5	36	25	1.44
6	6	15	0.40
7	1	3	0.33
8	2	1	2.00
9	8	46	0.17
10	4	1	4.00
11	31	1	31.00
TOTAL	137	131	1.05

5.3.1 Ceramics

The artifact assemblage at site 41EP2611 probably dates from a number of occupations perhaps beginning in the Late Archaic period and continuing through the El Paso phase (A. D. 1400). The proximity of El Paso Brown sherds dating to A. D. 400-1200 and hearths dating to approximately 2000 B. C. supports site multicomponency. Prehistoric occupation in southern New Mexico and west Texas has been divided into Mesilla phase (A. D. 400-1200) and El Paso phase (A. D. 1200-1400) occupations. The first phase is primarily marked by the occurrence of El Paso Brown, and the second phase by El Paso Polychrome. The Mesilla Phase dates are according to Whalen (1978), except that the 100-year gap between A. D. 1100 and 1200 (the former Dona Ana Phase) is subsumed under the Mesilla Phase in this analysis. Frequencies of Chupadero and Mimbres whitewares are similar to those observed in the eastern and western Hueco Bolson (Whalen 1978:59). Mimbres whiteware is cross-dated to the Mesilla Phase, and Chupadero is dated to the El Paso Phase (Whalen 1978:58). The nonChupadero whiteware sherds have been identified as Mimbres based on surface and paste attributes and the petrographic analysis.

Major erosion at the site is indicated by the six terraces excavated into the hill slope and by the lack of vertical distance between the sherds and Late Archaic hearths. It is probable that mechanical disturbance removed many artifacts with the fill, and that the remaining deposits were subject to aeolian erosion, resulting in a compression of occupational layers and a lack of artifactual context. Where artifacts and features are preserved, they are primarily situated on hardpan or in blowouts where little depth is indicated.

The total number of 131 surface ceramics and site size of 46,875 m^2 produce an overall ceramic density of 0.003 items per square meter, or one sherd every 358 m^2. Ceramic densities for individual areas range from 0 in Area 3 to 8.3 sherds per square meter in Area 2.

5.3.1.1 Ceramic Types by Site Area

The ceramic assemblage is discussed first, as a means for providing relative dating of the 11 site areas. The analysis focuses on classifying site material culture into types thought to be diagnostic of particular time periods, thus allowing the definition of site components.

Areas containing ceramics can be dated by types to the Mesilla (A. D. 400-1200) or El Paso (A. D. 1200-1400) phases. These dates are most useful for those areas containing fairly large numbers of ceramics: these are Areas 2, 5, 6, and 9, all with 10 or more sherds. Low density areas contain either El Paso Brown or unidentified brownware sherds (Table 5.3). Site areas with higher densities of ceramics have greater varieties of sherds. Area 2 has the greatest variety of types (6), followed by Area 9 with five types.

Table 5.3 Ceramic Types by Site Area, 41EP2611, El Paso SE Cultural Resources Study, ACOE, 1987.

	AREA										
Type	1	2	4	5	6	7	8	9	10	11	Total
El Paso Brown	-	31	-	14	11	1	-	21	1	1	80
El Paso Polychrome	-	1	-	-	-	-	-	14	-	-	15
Chupadero whiteware	-	-	-	-	-	-	-	5	-	-	5
Mimbres whiteware	-	2	-	-	-	-	-	-	-	-	2
Unid. brownware	1	2	1	6	2	2	1	4	-	-	19
Unid. buff/orange/ redware	-	1	-	5	2	-	-	2	-	-	10
TOTAL	1	37	1	25	15	3	1	46	1	1	131

Based on the above ceramic types, occupation at 41EP2611 can be divided into Mesilla phase occupations in Areas 2, 5, 6, and 9 and El Paso phase occupations in Area 9. Only two rim sherds were located. These are pictured in Figure 5.15. Rim sherd C is an El Paso Brown rim from Area 2. The rim is somewhat pinched, which agrees with Whalen's (1978:59-60) categorization of earlier El Paso Brown (A. D. 400-700). One cannot make any general statements, however, about a sample consisting of one sherd. Rim sherd D is an El Paso Polychrome sherd from Area 9. It does not closely resemble any of Whalen's (1978:68-69) rim profiles but is more like the earlier El Paso Polychrome forms than the later, more wedge-shaped and flared forms.

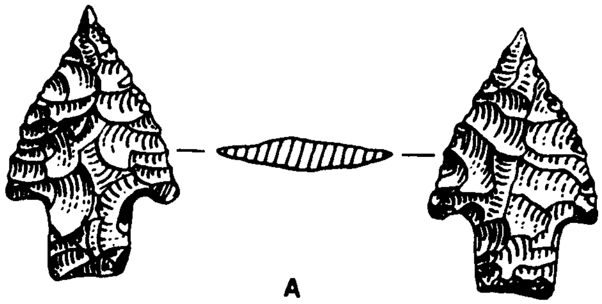
Where body instead of rim sherds are present, the unidentified brownware (Whalen's [1978] unspecific brown) type is sometimes necessary. Since only the upper third of El Paso Polychrome vessels was painted and the unpainted lower two-thirds resembles El Paso Brown in surface color, temper, and paste, it may be impossible to distinguish El Paso Brown lower body sherds from El Paso Polychrome sherds. Smoother surface finish may indicate El Paso Polychrome when sherd surfaces are uneroded (Whalen 1978:58).

Distinction between earlier and later El Paso Brown has been based on rim diameter, mean vessel wall thickness rim profile, and vessel finish. Earlier El Paso Brown sherds tend to be smaller and thicker-walled than later types. Mean rim diameter for early sherds is 13.2 cm (n=24, sd=4.3) and mean vessel wall thickness is 5.6 mm (n=100, sd=1.1). Pinched rims are characteristic of early sherds. Later El Paso Brown sherds, on the other hand, have a mean rim diameter of 17.0 cm (n=20, sd=4.9) and mean vessel wall thickness is 5.0 mm (n=100, sd=0.9). Later rim sherds tend to be less pinched at the lip and are flattened at the tip (Whalen 1978:62-63).

Another ceramic variable which may aid in distinguishing earlier from later El Paso Brown is surface texture. Scraping of the vessel to obliterate coils, without subsequent smoothing or polishing, is most common in the earlier forms (Whalen 1978:60). Scraping occurs on nine sherds from site 41EP2611, from Areas 2 (two sherds), 5 (five sherds representing 3-4 vessels), and 9 (two sherds representing one vessel). Surface finish is thought to be smoother on later El Paso Brown vessels (Whalen 1978:63). Seven El Paso Brown sherds exhibit finely finished, interior and/or exterior. These occurred in Areas 2 (one sherd), 6 (two sherds), and 9 (four sherds representing 2-3 vessels). Together, these attributes suggest that Areas 2 and 9 contain an earlier Mesilla phase occupation; Area 5 may also contain an early El Paso Brown occupation.

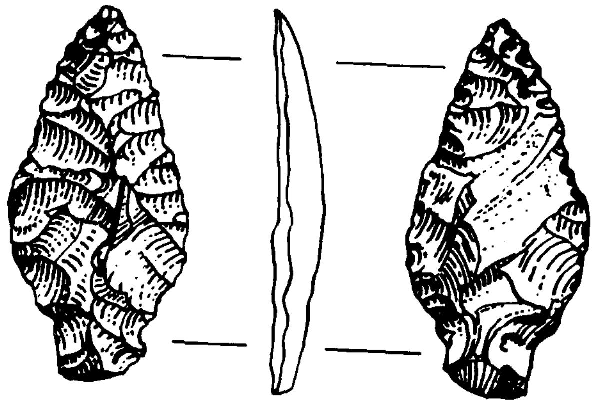
Together, the relative dating information from site 41EP2611 ceramics indicates that Area 9 represents the remains of three different components. This area contains substantial numbers of El Paso Brown and Polychrome sherds, as well as Chupadero whiteware, which date it to both the Mesilla and El Paso phases. The polychrome rim sherd suggests that the El Paso phase occupation may date to the earlier part of the phase. A C-14 date from Feature 6 reflects an A. D. 1190-1360$\pm$70 range, which is not precise enough to specify early vs. late El Paso Phase. The scraping marks on some of the El Paso Brown sherds reflect an earlier Mesilla phase occupation, while the polishing on other sherds suggest a later Mesilla use, also. Thus, use of Area 9 may date

Figure 5.15 Select Artifacts from 41EP2611, El Paso SE Cultural Resource Study, ACOE, 1987.

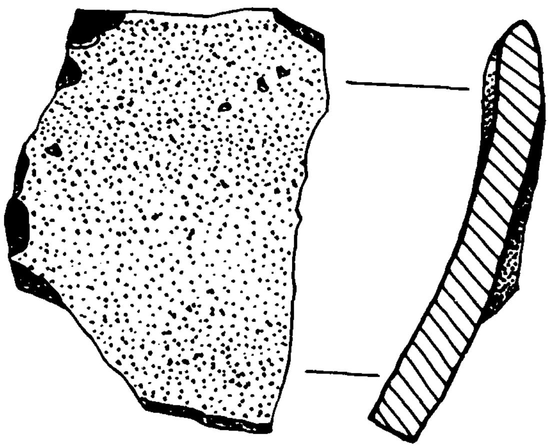


A

A. Leslie Type 6C Point, west of Areas 1 and 2 outside of ROW.

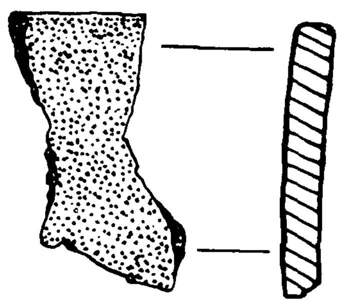


B. Leslie Type 10B, Maljamar Point, Area 10.



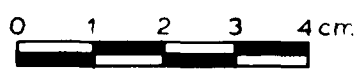
C

C. El Paso Brown Rimsherd, Area 2.



D

D. El Paso Polychrome Rimsherd, Area 9.



to both early and late Mesilla phases and to the early El Paso phase. Area 2 appears to date to both early and late Mesilla phases, based on the pinched rim sherd, presence of Mimbres whiteware, scraping marks, and polishing on El Paso Brown sherds. Area 5, on the other hand, can be tentatively placed in the early Mesilla phase based on scraping marks. Area 6 can be placed in the late Mesilla phase based on polishing.

The above patterns are suggestions only, based on small and residual samples. It is almost certain that the original assemblages present have experienced considerable attrition due to mechanical disturbance. Of the two areas with the largest remaining ceramic samples, however, both appear to be multicomponent. This situation reinforces the impression, based on the large number of small hearths and the extensive scatter of materials, that the site was reused on a short-term, overnight basis for a long span of time.

5.3.1.2 Summary of Ceramic Assemblage

Only 5 percent (6) of the 131 sherds were from bowls; types were Mimbres whiteware, an unidentified redware, and El Paso Brown. The overwhelming majority (124 sherds) were jar sherds. Eleven percent (14) of the sherds were painted. Paint included both the black and red mineral paint of El Paso Polychrome and the white slip of Mimbres and Chupadero types.

In comparison, ceramics on the adjacent site 41EP418 were primarily El Paso Polychrome, which is consistent with the abundance of this type in Area 9, the southernmost of the 41EP2611 proveniences. Chupadero whitewares occurred on both sites. Mimbres whiteware was present on 41EP2611 but not reported for 41EP418. Present on 41EP418 but not on 41EP2611 were smudged-indented corrugated, Carretas Polychrome, Babicora Polychrome, and possibly Casas Grandes Plainware.

Other ceramic attributes were surface texture, surface color, paste color, and temper (Table 5.4). In terms of surface texture, 76% (100) of the 131 sherds were smoothed.

Only two sherds were badly eroded, confirming the site 41EP418 observation that ceramic preservation was generally good. Surface color was predominantly brown (92 sherds or 70%), characteristic of El Paso wares or unidentified brownwares. Nine percent (12) of the sherds had buff, orange, or red surfaces. Eleven percent (15 sherds) were smudged. Seventy-four percent (97) of the sherds had the dark gray paste characteristic of El Paso Brown and Polychrome. Eight percent (10) had a light gray paste (half of these were Chupadero whitewares; other types represented were unidentified brownwares and redwares). Seventy-four percent (97) of the sherds also had the popcorn sand temper characteristic of the two El Paso ceramic types. Fourteen percent (18) had fine sand or sand and feldspar temper. Twelve percent (16 sherds) had medium size sand and/or gray feldspar temper. These medium and fine temper sizes are characteristic of unidentified brownware, redware, Chupadero, and Mimbres types.

Table 5.4 Selected Ceramic Variables, 41EP2611, El Paso SE Cultural Resource Study, ACOE, 1987.

Ceramic Texture	Frequency
Smooth	100
Polished Int. & Ext.	3
Scraped	12
Eroded	2
Polished Exterior	14
TOTAL	131

Surface Color	Frequency
Brown	92
Buff	3
Orange	5
Red	4
Gray	4
Smudged	15
Ext. Brown/Interior Red	3
White	3
Ext. Brown/Interior Gray	1
Ext. Red/Interior Gray	1
TOTAL	131

Paste Color	Frequency
Dark Gray	97
Light Gray	10
Red Brown/Gray	2
Tan/Gray	1
Brown	1
Brown/Tan/Red	2
Red/Gray	3
Brown/Red	2
Orange	4
Red/Orange/Brown	1
Brown/Gray	1
Dark Brown	2
Unknown	5
TOTAL	131

Temper	Frequency
Popcorn	97
Fine	8
Fine Sand	4
Fine Sand/Gray Feldspar	6
Medium Sand	12
Medium Sand/Feldspar	4
TOTAL	131

5.3.1.3 Temper Summary

Further information on temper is provided by the petrographic analysis (Appendix C). Tempering materials are crushed monzonite (three El Paso Brown and three El Paso Polychrome sherds), sand (one plain buff/orangeware sherd), crushed quartz monzonite (one Mimbres whiteware sherd), crushed syenite (one plain brownware and one plain buffware sherd), and sherd temper (two Chupadero whiteware sherds). The sample of 12 sherds suggests that tempering materials were homogeneous within ceramic types. Much of the 41EP2611 temper appears similar to that of the 92 El Paso Brown and four Alma Plain sherds from Keystone Dam Site 32; nonpetrographic analysis of those sherds indicated that all vessels were tempered with sand, where fine- to medium-grained sand (0.1-0.5 mm) was present in all sherds, and most contained large amounts of coarse to very coarse grains (averaging 1.0 mm in diameter). Petrographic analysis from other El Paso area sites suggests that El Paso Brown temper consists primarily of quartz and feldspars and constitutes 25-50% of the body (Fields and Girard 1983:201).

The 41EP2611 petrographic analysis suggests that the tempering materials found in the El Paso Brown and El Paso Polychrome, plain brownware, plain buffware, and Mimbres whiteware sherds do not occur within a 15-20 km radius of the site, indicating that these items possibly were not locally made. The plain buff/orangeware was tempered with sand and was probably made at a location different from the source for the El Paso wares. The Chupadero whiteware sherds, both tempered with sherds, share a common source area.

The petrographic results from 41EP2611 are compared with the results from tested features near Santa Teresa, New Mexico (O'Leary 1987), because of the two sites' proximity and similar aeolian settings and artifact assemblages. The six El Paso Brown and El Paso Polychrome sherds from 41EP2611 are very similar to 36 unspecified brownware (unpainted body sherds, either El Paso Brown or El Paso Polychrome) ceramics from the Santa Teresa area. The two sets of sherds share the following attributes: common tempering material (green hornblende), clay matrices with abundant silt sized particles, a mottled thick-and-thin texture, and 40-45% temper. The only noticeable difference is that half of the Santa Teresa sherds contain hematite (Garrett 1987). The fairly broad distribution of these El Paso wares possibly from the same source in sites in southern New Mexico and west Texas may indicate high residential mobility or trade.

5.3.2 Lithics

Lithic artifacts on 41EP2611 total 137. For the overall lithic assemblage, debitage (both flakes and angular debris) represented 59% and cores/cobbles/hammerstones 18% (Table 5.5). Nine percent of the items were fire-cracked rock. Other artifact types comprised less than 5% of the assemblage. Overall density for these classes is the following: debitage ($0.002/m^2$), cores/cobbles/hammerstones ($0.0005/m^2$), fire-cracked rock ($0.0003/m^2$), ground stone ($0.0001/^m2$), and tools/shaping flakes/retouched flakes ($0.0003/m^2$).

The lithic discussion is based on surface artifacts. Because of deflation, only two subsurface artifacts were located, all near the surface. These are two refitting pieces of angular debris made of red chert, found in Level 1 of Feature 1. These artifacts are not included in the discussion below. There was also one piece of shell found in Level 1 of Feature 6.

Two points were found on the site. One of these (Figure 5.15A) was found outside the ROW and was sketched but not collected. This point came from the fourth terrace from the north, west of areas 1 and 2 near the cutbank at the south edge of this terrace. The point does not resemble any of the ceramic period points illustrated in Whalen (1980:38) and dating to the late Mesilla phase. In the absence of a better comparative typology, the point was compared to Leslie's (1978) typology for the Jornada Mogollon eastern extension. It most resembles Type 6-C, characterized as triangular, with wide corner notches, a wide stem, and average dimensions about 3 cm for length, about 2 cm for width, and about 0.6 cm for thickness. Unlike illustrated specimens, the 41EP2611 point was serrated. Most common date, based on ceramics, is A. D. 850-1000 (this date assumes that El Paso Brown does not begin until around A. D. 900, a date now known to be 500 or more years too late). Associated ceramics in the eastern extension area are Jornada Brown, and several black-on-white types (Red Mesa, Cebolleta, and possibly Mimbres). Similar types are noted in several parts of Texas, including Brewster County, and at Paa-ko Pueblo (Leslie 1978:122, 124, 126). Cross-dating would place this point within the (possibly early) Mesilla phase.

Table 5.5 Lithic Artifacts and Material Types, El Paso SE Cultural Resource Study, ACOE, 1987.

Material Type	Frequency	Percent	Artifact Type	Frequency	Percent
Chert	57	42	Debitage	81	59
Siltstone	47	34	Core/Hammerstone	24	18
Quartzite	15	11	Fire-Cracked Rock	12	9
Basalt	3	2	Biface Flake	3	2
Chalcedony	9	7	Ground Stone	6	4
Rhyolite	4	3	Retouched Flake	4	3
Granite	2	1	Uniface	2	1
			Point	1	1
			Biface	3	2
			Discoid	1	1
TOTAL	137	100		137	100

The second point (Figure 5.15B) was found in Area 10, on the same terrace as the first point but some 65-75 m to the northeast. This point, also serrated, most resembles Leslie's (1978) Maljamar Type 10-B. Type 10-B features a leaf shape, convex blade edges, side notches, rounded to pointed base, and average dimensions of 4.5 cm length and 0.5 cm thickness. Size suggests these are dart points, and known artifact associations indicate preceramic dates possibly overlapping with the early part of the ceramic period (Leslie 1978:125, 138, 140). Similar points have been reported from Texas. The collected specimen is 5 cm long and made on a curved flake. A morphologically similar but smaller arrow point (1.5 cm shorter), also made on a flake with the base as the striking platform, is illustrated and described in Fields and Girard (1983:153-156) under miscellaneous points. Thus, the point probably dates to the Archaic period or the early Mesilla phase based on morphology.

The only sherd from Area 10 is an El Paso Brown neck sherd with no distinguishing characteristics to mark it as either early or late. The two dated hearths less than 75 m away both date to the Late Archaic period. Due to active deflation in Area 10, it is impossible to determine whether the point and sherd are associated and to assign a narrower date. Lacking evidence of Early or Middle Archaic remains on the site, it is possible to term the point Late Archaic to (perhaps) early Mesilla phase in date.

5.3.2.1 Lithic Artifacts by Site Area

The following discussion presents lithic artifacts by area, in order of northernmost to southernmost proveniences. Later in the discussion, artifacts are presented according to material types.

Area 11, comprising the third terrace from the north within the ROW, contains 31 lithic artifacts. This area is dated by Feature 2 (2080 B. C.±60) and the nearby Feature 1 (2020-2040 B. C.±260 and 2150 B. C.±70) to the Late Archaic period. Fourteen of the items are debitage, seven are cores/cobbles/ hammerstones, two are fire-cracked granite, two are biface flakes, four are ground quartzite fragments, and two are biface fragments. Six pieces of debitage are made of gray chert, and two cores are made of the same material. Another core is made of pink chert, which was the material used for the biface fragment. The second biface fragment was native chalcedony. Siltstone is another important material type. Five pieces of debitage, two cores/ hammerstones, and two biface flakes are made of gray siltstone. Pink siltstone was used for one piece of debitage and one flake. Thus, six artifacts were used for heating (fire-cracked rock) or processing, and four artifacts in biface tool manufacture. A major activity in this area involved lithic reduction. The biface flakes and fragments are not from the same reduction sequence, based on the different materials and colors involved.

Area 10 produced four lithic artifacts. The point and El Paso Brown sherd suggest a Late Archaic/Early Mesilla phase date. Three of the four artifacts are debitage, and one is a point. The debitage is made of brown chert and gray chalcedony, while the point is made of dark gray chert. Three different material types are represented, and activities in this area include lithic reduction and tool discard.

Seven lithic artifacts were found in Area 1. The area may date to the ceramic period, based on the unidentified brownware sherd found. Four cores/hammerstones and three pieces of debitage were recorded. The debitage is made of white and gray chert, and the cores of different materials. One core is made of gray and one of purple siltstone, and one each of gray quartzite and gray basalt. The remains reflect lithic reduction activities of at least five different materials.

Twenty-two lithics were found in Area 2. This area appears to date to both early and late Mesilla phases, based on rim, scraping marks, and polish attributes on El Paso Brown sherds. The lithics consist of 10 pieces of debitage, eight cores/hammerstones, and four pieces of fire-cracked rock. All fire-cracked rock is gray in color, with two pieces of siltstone and two pieces of rhyolite present. Three pieces of debitage are made of gray chert, as are five cores/hammerstones. Four pieces of debitage and two cores are made of gray siltstone. One piece of debitage is made of purple siltstone. An additional core is made from white siltstone. One of the two chalcedony debitage items is white and one brown. Activities in this area consisted of processing and lithic reduction. Cores and debitage are present for two material types, while three other materials are represented by either debitage or a core.

Area 3 produced 10 lithic items, consisting of nine pieces of debitage and one retouched flake. No sherds were found in this area, suggesting that it could be preceramic in date. Five of the items are made of gray chert and three of gray siltstone. Other materials are yellow chert and pink chalcedony. Activities in this area were lithic reduction and tool use. At least four materials were involved in reduction.

Area 4 contained one unidentified brownware sherd and may date to the ceramic period. Ten lithics were present, consisting of seven pieces of debitage, one piece of fire-cracked siltstone, a retouched flake, and a biface fragment. Four pieces of debitage and the biface fragment are made of gray chert. One piece of debitage is made from pink chert. Two pieces of debitage and a retouched flake are made from gray siltstone. Activities included processing, tool manufacture (with no evidence of use), and lithic reduction. Three different material types were involved.

Area 5 dates to the early Mesilla phase, based on scraping marks on the El Paso Brown sherds. Thirty-six lithics were found in this area. Included in this number are twenty-eight pieces of debitage, two cores/hammerstones, one biface flake, two pieces of ground quartzite, two retouched flakes, and a discoid. Twelve pieces of debitage and the discoid are made of gray chert. Eleven pieces of debitage, a core/hammerstone, a biface flake, and a retouched flake are made of gray siltstone. Other material types used were pink siltstone (two pieces of debitage), pink chert (two pieces of debitage), chalcedony (two pieces of debitage), white chert (one piece of debitage), pink rhyolite (a core/hammerstone), and brown chert (one retouched flake). Activities included processing, tool manufacture, and lithic reduction. Two types of material were used in tool manufacturing. Only the discoid showed evidence of use; it may have been manufactured in the area. Seven different materials were used in lithic reduction (combining the white and gray chert).

Area 6 contained six lithic artifacts. This area possibly dates to the later Mesilla phase, based on polished El Paso Brown sherds. The two pieces of debitage are both made of gray siltstone, as is the single core or bifacially tested cobble. A piece of fire-cracked quartzite was present. Two unifaces were present, one made of white and one of gray chert, both utilized. The siltstone artifacts represent lithic reduction and the fire-cracked rock processing activities. The unifaces suggest tool use, with manufacturing having occurred elsewhere.

Area 7 possibly dates to the Mesilla phase, based on a single El Paso Brown sherd. The only lithic artifact found here was an exhausted core/core fragment made of gray quartzite. No reduction debris was present.

Area 8 contained two lithic artifacts. This area possibly dates to the ceramic period, based on the unidentified brownware sherd. The artifacts are two pieces of fire-cracked quartzite, representing processing activities.

Area 9 contained eight lithic artifacts. This area possibly dates to the early and late Mesilla phases and the earlier El Paso phase, based on El Paso Brown and Polychrome sherd attributes. Artifacts are five pieces of debitage, a tested cobble, and two pieces of fire-cracked quartzite. Three pieces of debitage are made of chert, one of siltstone, and one of quartzite. The tested cobble is also made of chert. Activities represent processing and lithic reduction.

5.3.2.2 Summary of Lithic Attributes and Raw Materials

Six pieces of ground stone occurred on site 41EP2611. Two pieces were in Area 5, and four were in Area 11. The ground stone fragments of unidentifiable type from Area 5 are made of gray quartzite and have one grinding face. The ground stone fragments from Area 11 are made of both gray and pink quartzite, and all are unifacial. Two pieces are tabular and probably represent metate fragments. Another fragment is a cobble that had been battered on one end and used as a hammerstone. A fourth fragment is unidentifiable as to ground stone type.

Chert represents 42% (57 items) of the 41EP2611 assemblage. Seventy-two percent of chert artifacts are debitage and sixteen percent are cores/cobbles/hammerstones (Table 5.6). Chert is the most common material for formal tools. There are one chert point and two chert biface fragments, as well as two unifaces/unifacially tested cobbles and one discoid.

Table 5.6 Lithic Artifact Types by Material, 41EP2611, El Paso SE Cultural Resource Study, ACOE, 1987.

	Chert		Siltstone		Quartzite		Chalcedony		Basalt		Rhyolite		Granite	
Artifact Type	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Debitage	41	72	28	60	2	13	8	89	1	33	1	25	0	--
Core/Cobble/ Hammerstone	9	16	10	21	2	13	0	--	2	66	1	25	0	--
Fire-Cracked Rock	0	--	3	6	5	33	0	--	--	--	2	50	2	100
Biface Flake	0	--	3	6	0	--	0	--	--	--	--	--	--	--
Ground Stone	0	--	0	--	6	40	0	--	--	--	--	--	--	--
Retouched Flake	1	2	3	6	0	--	0	--	--	--	--	--	--	--
Uniface/Unicobble	2	4	0	--	0	--	0	--	--	--	--	--	--	--
Point	1	2	0	--	0	--	0	--	--	--	--	--	--	--
Biface	2	4	0	--	0	--	1	9	--	--	--	--	--	--
Discoid	1	2	0	--	0	--	0	--	--	--	--	--	--	--
TOTAL	57	42	47	34	15	11	9	7	3	2	4	3	2	1

Thirty-four percent (47) of the lithic artifacts are made of siltstone. It was used both for tool manufacture and as fire-cracked rock. Only 60% (28 items) of the siltstone artifacts are debitage. Twenty-one percent (10) of the siltstone items are cores/cobbles/hammerstones. Also included are three each fire-cracked rocks, biface flakes, and retouched flakes.

Eleven percent of the artifacts are made of quartzite. Only 26% of the quartzite artifacts were either cores/cobbles/hammerstones (2 items) or debitage (2 items). Another 40% of the quartzite items are ground stone. A final 33% (5) of the 15 quartzite items represent fire-cracked rock.

Seven percent (9 items) of the site 41EP2611 artifacts are made of chalcedony. Debitage represents 89% (8) of the nine artifacts. There is one chalcedony biface fragment.

Basalt, rhyolite, and granite each represent less than 5% of the lithic assemblage. One of the three basalt items is debitage, and the other two pieces are a tested core and a unicobble. Two of the four rhyolite pieces are fire-cracked rock, one is a flake, and one is a hammerstone/tested core. Both of the granite items are fire-cracked rock.

Material types reported for 41EP2611 but not for the adjacent 41EP418 were siltstone, quartzite, chalcedony, basalt, and granite, possibly indicating greater material diversity at 41EP2611. On the other hand, obsidian was present on 41EP418 but not on 41EP2611, except as a tiny noncultural fragment.

Lithic attributes of cortex and platform presence, number of complete pieces, and utilization are discussed below. Cortex is present on 38% (52 items) and absent on 57% (78 items) of the lithic assemblage (for some items, this variable is not applicable). The 57% of the assemblage lacking cortex would appear to represent interior core reduction or tool manufacture. In terms of platform presence, 81% (64) of flakes have a platform, 9% (7) lack a platform, and 10% (8) have collapsed platforms.

Seventy-three percent (86 items) of the lithic artifact types for which portion is a relevant variable are complete (angular debris and cores were coded as complete). Twenty percent of the assemblage consists of fragments, primarily flake fragments. Seven percent (8) of the assemblage represents exhausted cores. Finally, utilization is present on 18 chipped and ground stone items, or 13% of the overall assemblage.

5.4 SITE INTEGRITY AND POSTDEPOSITIONAL ACTIVITIES

Significant postdepositional activities are primarily cultural in origin, exacerbated by natural factors such as wind action. The primary impact has been large-scale mechanical blading of the hill slope for fill dirt removal. Blading of the access road has similarly exposed features on the dune's indurated surface. Pothunting has been a second rank impact on the site's artifact assemblage. Construction of Bluff Channel and Americas Reservoir would constitute future adverse impacts. Aeolian erosion has acted on site deposits remaining after mechanical disturbance, in the northern, older part of the site, probably dropping the ceramic period artifacts to the level of the Late Archaic hardpan. Aeolian erosion and slope wash will continue in areas where the ground surface is not stabilized by vegetation or hardpan exposure. Figure 5.16 shows how presence of the hardpan surface helped to preserve part of the Feature 7 burned area located on the cutbank between Terraces 3 and 4. Figure 5.17 shows Feature 1's position on the fence bank; excavation showed that the downslope half of the feature has experienced erosion due to slope wash and aeolian action. This feature is situated below hardpan, and the bank is stabilized only by the presence of the fence and

Figure 5.16 Feature 7 Before Excavation, Showing Hardpan at Edge of Cutbank, El Paso SE Cultural Resource Study, ACOE, 1987.

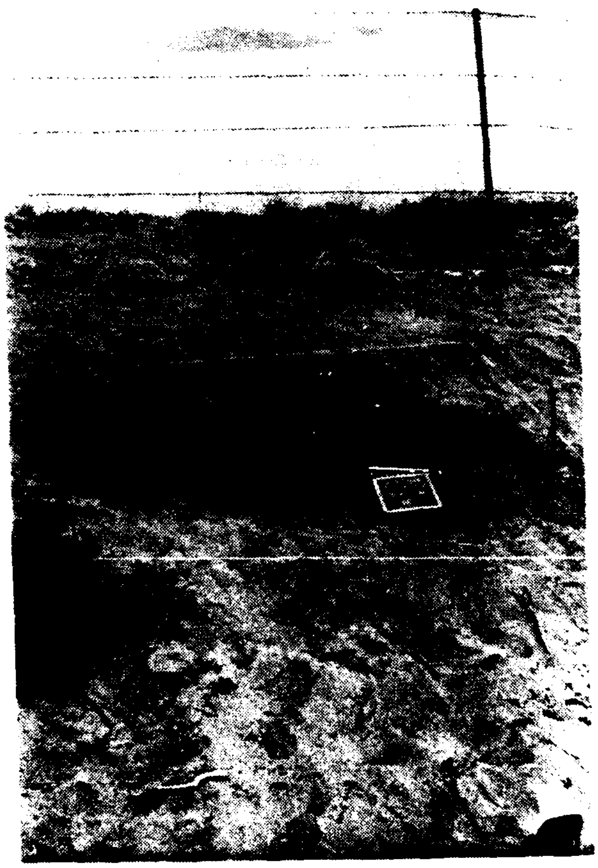


Figure 5.17 Feature 1 During Excavation, Showing Position on Slope and Aeolian/Colluvial Erosion, El Paso SE Cultural Resource Study, ACOE, 1987.

undisturbed deposits on its other side. In Area 2, artifacts occur on the ridges formed on the lee side of large backdirt piles (Figure 5.18). The position of the artifacts could reflect earthmoving disturbance or protection by the backdirt from further aeolian erosion of the intermittent hardpan surface on which they occur.

Site integrity was estimated by examining the proportion of site areas with hardpan remaining or with artifacts exposed on loosely consolidated dunal deposits. Based on dates from Features 1 (2020-2040 B. C.±260 and 2150 B. C.±70) and 2 (2090 B. C.±60) on and below Terrace 3 hardpan, the northern part of the site appears to date to the Late Archaic period. The presence of only one sherd in Area 11, located on this terrace, supports this interpretation. Feature 6, on hardpan in Area 9, on the other hand, dates to the El Paso phase (A. D. 1190±70); this may suggest a later date for occupation on hardpan in the southern part of the site. This area is shown in Figure 5.19, taken from the vicinity of Feature 6 and looking towards 41EP418 near the more distant of the two telephone poles in the picture. The dated features may oversimplify variability in dates and areas of site occupation, however. If occupation of hardpan on Terrace 3 is primarily Late Archaic, then the two sherds from Areas 10 and 11 could have resulted from limited later occupation. This situation would imply that mechanically removed overlying deposits contained few ceramic period artifacts. In Area 9, since the hearth dates to the El Paso phase, the end of prehistoric occupation in the lower Rio Grande Valley of west Texas, it is expected that no great amount of later or contemporaneous materials was removed by blading.

Overall site integrity based on hardpan exposures and unconsolidated dune deposits with artifacts is approximately 78%. This figure is derived from estimates for Terrace 3 (75%), Terrace 4 (60%), Area 9 (85%), and Area 6 proximity (90%). These percentages were averaged to produce the 78% figure. The presence of hardpan and dune deposits with artifacts does not, however, indicate the degree to which the hardpan surface has been swept clean by wind action, and artifacts exposed in loose sand may have been misplaced by machine action. Actual site integrity is probably much lower than 78% because of these factors, perhaps approximately 40-50%.

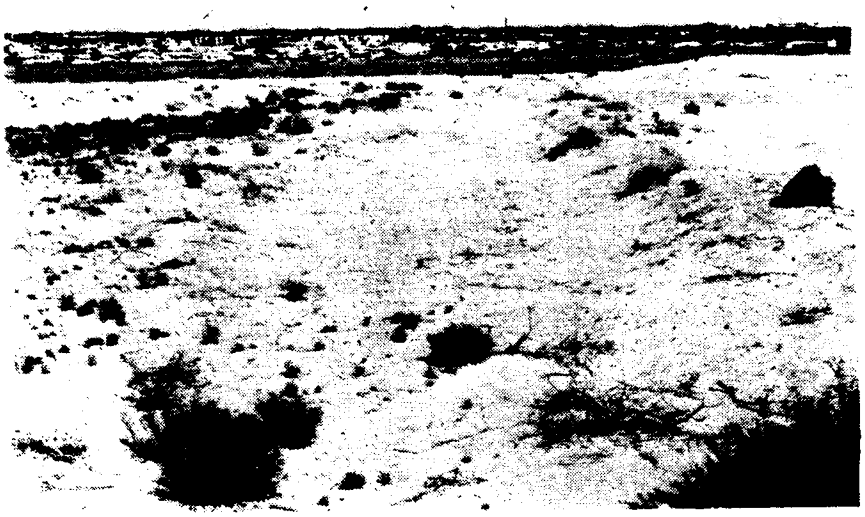


Figure 5.18 Area 2 Artifacts Exposed on Ridges on the Lee of Backdirt Piles, El Paso SE Cultural Resource Study, ACOE, 1987.

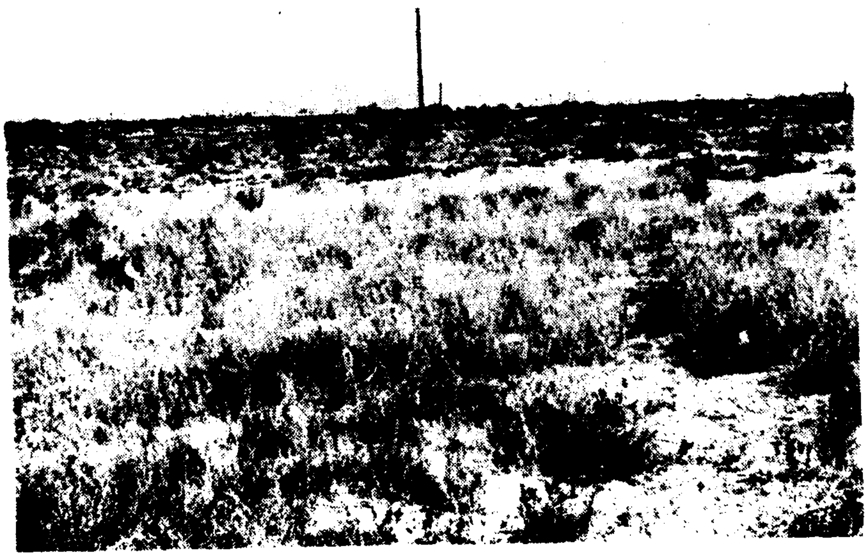


Figure 5.19 From Area 9 to 41EP418, in the Vicinity of the Second Distant Telephone Pole in Center of Photograph, El Paso SE Cultural Resource Study, ACOE, 1987.

6.0 RECOMMENDATIONS

Amy C. Earls

Intensive cultural resource survey of the El Paso Southeast project area located an extensive ceramic, lithic, and ash stain scatter at the lower portion of the Bluff Channel and the upper portion of the Americas Basin. This scatter is defined as one site and is deemed potentially eligible for inclusion in the National Register of Historic Places because of the chronological potential of hearths and diagnostic artifacts. Results of artifact analysis and laboratory reports suggest that the site is a multicomponent Late Archaic, Mesilla, and El Paso phase occupation. The multitude of hearths of Late Archaic to El Paso Phase date, the lack of structures, and the low density of artifacts suggest that the site represents a number of short-term occupations over many years, during which the ground surface was relatively stable.

The site's visibility at present, however, relates to earth disturbing activities. Sometime after 660 B. P. (the radiocarbon date for Feature 6) and probably dating to the late nineteenth century, when historical accounts document overgrazing and intensive agricultural activities, dunes formed again in the Bluff Channel area. The site's location is ideal as a repository for sands from the Rio Grande floodplain during periods of vegetative denudation. This active layer of sand served to bury many of the prehistoric components. Blading of the hill slope into a series of six terraces during the last 4-10 years served to expose these materials once again. At the same time, however, many cultural materials were probably removed with the fill dirt, reducing site integrity to approximately 50%. Subsequent aeolian erosion has taken its toll of cultural materials, with most remaining hearths badly deflated, represented by only surface stains or fire-cracked rock with little charcoal; Feature 1 is a fortunate exception. Other adverse impacts to the site have included pothunting (by a former nearby resident, according to Doris Kohls, presently renting the poultry/horse farm west of the site). Perceived future impacts are continued aeolian erosion, possible pothunting, and Bluff Channel and Americas Reservoir construction.

Previously recorded site 41EP418, west of the Bluff Channel site, should be safe from most construction activities. However, because of its proximity to the bladed access road and the presence of hearths in the road, care should be taken that it is avoided during construction. For the Bluff Channel site itself, part of which is located within the channel ROW, the area should be monitored by an archaeologist during channel blading. Additional subsurface materials, if present, could have retained better cultural context than materials currently exposed at the ground surface. Such features and associated artifacts would be well worth archaeological recording for the potential to document prehistoric activity in the floodplain area. For the Bluff Channel, also, care should be taken to avoid damage to the western portion of the site, outside of the ROW. This area, like 41EP418, is situated near the access road and, unless other access roads are built, will receive much vehicular and foot traffic. Hearths and artifacts (such as the point discussed in Section 5.4 and shell) do occur in the western portion of the site and should be protected from adverse impact. Finally, if the location of the ROW changes appreciably from its planned siting, archaeologists should be notified in order to prevent damage to unrecorded surface cultural materials.

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APPENDIX A:

Pollen Analysis from Site 41EP2611

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A total of three archaeological pollen samples was submitted for analysis to the Texas A & M University Department of Anthropology Palynology Laboratory. The samples were collected from Feature 1, a large subsurface charcoal and ash-filled basin, in a multicomponent Archaic, Mesilla, and El Paso phase Mogollon site (41EP2611) in southeastern El Paso, Texas. It was anticipated that pollen analysis would offer insights into site use, feature function, and the general paleoecology of the area. Sample proveniences are provided in Table A.1.

Table A.1 Proveniences of the 41EP2611 Pollen Samples.

Sample EP-1	Sample 4 Feature 1 (B) Test Pit 1 Level 3
Sample EP-2	Sample 15 Feature 1 (B) Test Pit 1 Level 2
Sample EP-3	Sample 3B Feature 1 (C) Test Pit 1 Level 4

Methodology

Twenty-five mls of sediment were collected from each sample. Large pieces of stone, consolidated soil, and charcoal were excluded. The samples were then placed in 600 ml beakers for subsequent analysis. Two tablets of *Lycopodium* spp. tracer spores were added to the samples at this time. The purpose of employing tracer spores is twofold. First, quantification in terms of pollen concentration can be determined since a known quantity of spores (11,300 $\pm$ 400 per tablet) was added. Furthermore, in the event no pollen was recovered in the samples, the presence of *Lycopodium* spores would serve as a verification that processor error was not a factor.

A three-step processing technique was employed, consisting of the removal of carbonates with hydrochloric acid (HCl), the removal of silicates with hydrofluoric acid (HF), and the extraction of the lighter organic fraction through a heavy density separation.

The removal of carbonates was accomplished through the addition of concentrated hydrochloric acid. Approximately 75-100 mls of acid was added to the samples. This step further served the purpose of dissolving the calcium bonding of the *Lycopodium* spore tablets. All samples exhibited a very strong reaction at this stage due to a high carbonate content. When all carbonates were removed, the samples were rinsed thoroughly, washed through 350 micron screens, and returned to the beakers, where, after settling, the water was removed.

Silicates were removed from the samples through the addition of concentrated hydrofluoric acid. Again, approximately 75-100 mls of acid were added to each sample and allowed to work overnight. The samples were rinsed thoroughly, then transferred to 50 ml tubes. The samples were next sonicated, effectively disaggregating all particles of the sample. This step is crucial for the successful application of heavy density separation.

Zinc bromide ($ZnBr_2$), with a specific gravity of 2.00, was employed in the heavy density separation. Pollen, most charcoal, and many other organic particles have a specific gravity lower than silt and other contaminating particles. Thus, after centrifuging, lighter material is found floating on the $ZnBr_2$ solution. This material was pipetted off and rinsed. Because of the large amount of charcoal present in the samples, this step was repeated twice.

The samples were then transferred to 15 ml tubes, rinsed in absolute ethanol, stained with Safranin-O, rinsed in tert-butyl alcohol, and then transferred to a glycerine medium for storage in one dram vials. A single drop of the mixed residue was permanently mounted on a microslide and examined at 400x on a compound stereomicroscope. Identifications were made through the Palynology Laboratory's extensive comparative collection housed in the Anthropology Department. Results of the analysis are presented in Table A.2.

Concentration Values

Concentration values for the pollen samples were calculated and are presented in Table A.2. Vaughn M. Bryant (personal communication) has determined that pollen concentrations must generally meet a minimum of 1,000 grains per ml of sediment before feasible reconstructions of paleoenvironment can be determined. Lower values may mean that erosion or loss of grains from the sediment has occurred, possibly resulting in differential preservation. Because of the low concentration values for all samples, accurate appraisals of the paleoenvironment cannot be made. Rather, identified taxa are useful only in terms of presence/absence.

Discussion

A total of eight categories of pollen was identified, representing a minimum of seven taxa. By far the most abundant pollen type was that of Cheno-Am. This group represents plants of the family *Chenopodiaceae* and those of the genus *Amaranthus* in the family *Amaranthaceae*. Plants of this group were recovered in all samples. Though a frequently encountered grain, particularly in the desert Southwest, Cheno-Am pollen may signal disturbed areas (Thompson 1984), possibly as a result of aboriginal activity. The lack of statistically significant counts, however, precludes interpretations along these lines.

Table A.2 Results of the 41EP2611 Pollen Analysis.

Sample	Identification	Quantity
EP-1	Cheno-Am	12
	Pinus	5
	Poaceae	1
	Opuntia	3
	High Spine *Asteraceae*	1
	Ephedra torreyana-type	1
	Indeterminate	1
	Total	24
	Lycopodium	84
	Concentration Value (grains/ml)	258.3
EP-2	Cheno-Am	19
	Pinus	1
	High Spine *Asteraceae*	2
	Ephedra torreyana-type	1
	Indeterminate	1
	Total	24
	Lycopodium	160
	Concentration Value (grains/ml)	135.6
EP-3	Cheno-Am	32
	Pinus	5
	Poaceae	1
	Opuntia	4
	Quercus (modern)	81
	Indeterminate	5
	Total	128
	Lycopodium	244
	Concentration Value (grains/ml)	474.2
	Concentration Excluding Contaminant	174.1

Pinus (pine) pollen was also recovered from all three samples. Because of the large number of grains produced by pines, a few grains would probably be expected in most samples from the area and should be viewed as background pollen.

Poaceae (grass family) pollen was found in Samples 1 and 3. Pollen of this family is common in the desert-grassland community, and is frequently encountered in Southwestern samples.

Pollen identified as high spine *Asteraceae* was identified in Samples 1 and 2. This subgroup includes taxa such as *Helianthus* and other insect-pollinated types.

Ephedra (Mormon tea) *torreyana*-type pollen was found in Samples 1 and 2. Species in this subgenera include *E. trifurca* and *E. antisyphilitica*, both of which are common in the El Paso area today. *Ephedra* produces an abundance of pollen and would be expected in Southwestern pollen samples.

Pollen from genus *Opuntia* was identified in Samples 1 and 3. These grains compare favorably to the subgenera *Cylindropuntia* (chollas) or *Corynopuntia* (dog chollas). Because of their relative weight, large size, and zoophilous nature, *Opuntia* spp. grains are seldom found far from the source plant. It is possible that these grains are from *Opuntia schottii* or *Opuntia stanleyi*, both of which are encountered in the El Paso area. According to Weniger (1984), *Opuntia stanleyi* is found in west Texas along the Rio Grande where it forms impenetrable thickets. The site's proximity to the Rio Grande may support this idea.

Grains too badly eroded or distorted were placed in the category "indeterminant". Grains of this type were found in all samples.

In Sample 3, 81 grains identified as *Quercus* (oak) were found. Because of their pristine shape and the fact that some grains still contained cytoplasm, the grains were judged to be modern contaminants. It is likely that these grains were accidentally introduced into Sample 3 in the form of flowers or anthers at the time of collection. A spring collection date would support this.

The site area, at present, includes *Prosopis* (mesquite), *Xanthocephalum* (snakeweed) and other *Asteraceae* genera, *Salsola* (Russian thistle), and grasses. Adjacent lands contain *Larrea* (creosote bush) and *Atriplex* (saltbush). Fossil pollen taxa recovered reflect the modern plant assemblages.

Preservation in the Southwest is frequently poor owing to the high alkalinity of the soil (Bryant and Holloway 1983). The fact that any fossil pollen was recovered from site 41EP2611 must be viewed optimistically. Low concentration values, statistically invalid counts, and differential preservation, however, preclude any statements on paleoenvironment. A simple listing of identified taxa reveals species identified in the site area at present; thus, intimations of environmental change cannot be made. With the exception of *Opuntia* spp. pollen, grains identified represent taxa likely to be encountered in the Southwest as normal background pollen types. The presence of *Opuntia* cf. *Cylindropuntia* or *Corynopuntia* probably signals the presence of these genera in the site area. The occurrence of these grains in the site area cannot be attributed to the effects of man.

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APPENDIX B:

Flotation from MA235G-1 (41EP2611)
A Multicomponent Campsite Near El Paso, Texas

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CASTETTER LABORATORY FOR ETHNOBOTANICAL STUDIES, TECHNICAL SERIES #202

INTRODUCTION

MA235G-1 (41EP2611), an open campsite, is located on terraces between the Rio Grande (5.2 km to the southwest) and a series of bluffs to the north and east. At approximately 3700 feet (1128 meters) elevation, the sandy soil supports a desert scrub vegetation with dominants of mesquite (Prosopis), creosote bush (Larrea tridentata), and fourwing saltbush (Atriplex cancescens). Cultural deposits were shallow (within 45 cm of ground surface) and included nine thermal features and a wide diversity of artifactual material, scattered in low density. Ceramics indicated occupation included Mesilla and El Paso phases, ranging from AD 200 to 1400; carbon isotope dating evidenced an earlier Late Archaic component. Test excavations were limited to the five exposed thermal features with best potential for providing carbon-14 dates and primary depositional contexts. Four flotation samples, from three of these features, were submitted for analysis.

METHODS

The four soil samples collected during excavation were processed by Mariah Associates, Inc. (Mariah) by the simplified "bucket" version of flotation (see Bohrer and Adams 1977). For each sample, a standard one liter soil sample was processed. Where available (Sample 7, 16) an additional one liter backup sample was also processed; these samples have not been analyzed and are on file with Mariah. Each one liter sample was immersed in a bucket of water, and a 30-40 second interval allowed for settling out of heavy particles. The solution was then poured through a fine screen (about 0.35 mm mesh) lined with a square of "chiffon" fabric, catching organic materials floating or in suspension. The fabric was lifted out and laid flat to dry. Before reviewing under a binocular microscope (7 - 45x), each sample was sorted using a series of nested geological screens (4.0, 2.0, 1.0, 0.5 mm mesh). Each sample was examined in entirety.

From each flotation sample, a sample of 20 pieces of charcoal was identified (10 from the 4 mm screen, and 10 from the 2 mm screen). Each piece was snapped to expose a fresh transverse section, and identified at 45x. Low-power, incident light identification of wood specimens does not often allow species-or even genus-level precision, but can provide reliable information useful in distinguishing broad patterns of utilization of a major resource class.

RESULTS

Flotation samples from two levels in Feature 1 did not differ significantly in content. Sample 7 from Level 3 contained a single unburned beeweed seed (Table B.1) and all mesquite charcoal (Table B.2). Sample 16 from Level 2 contained an unburned scorpionweed seed, and one charred seed of an unknown annual weed, also with charcoal that was entirely mesquite. Flotation data support the notion that use of this large, deep charcoal and ash-filled basin (morphology commonly linked with function as a roasting pit) represents a single occurrence. C-14 dates are overlapping (3500 ± 250 BP and 3680 ± 60 BP) from levels above and below the flotation sample loci, and indicate a Late Archaic use.

Features 6 and 7 were smaller and shallower burn features built on the dune hardpan. A C-14 date for Feature 6 indicated this feature was used toward the end of the range of occupation for the site (660 $\pm$ 60 BP). Pricklypear cactus and purslane were present in both samples, and Feature 6 contained in addition seeds of seepweed and pigweed. With the exception of one charred pricklypear seed in Feature 6, all were unburned and likely contaminants. Charcoal in Feature 6 included a sizeable fraction of saltbush/greasewood, while Feature 7 contained one small fragment of an undetermined nonconifer other than mesquite.

Table B.1 Flotation Results, 41EP2611.

Provenience:	FS 7 Feature 1 Level 3	FS 16 Feature 1 Level 2	FS 21 Feature 6 Level 2	FS 23 Feature 7 Level 1
Soil Volume:	1000 ml	1000 ml	1000 ml	1000 ml
Taxon				
Amaranthus				
pigweed			1	
Cactaceae, cf. *Opuntia*				
pricklypear			1*	1
Cleome				
beeweed	1			
Phacelia				
scorpionweed		1		
Portulaca				
purslane			15	3
Suaeda				
seepweed			16	
Unknown		1		
TOTAL SEEDS	1	2	33	4
NUMBER OF TAXA				
All taxa	1	2	4	2
Burned taxa only	0	0	1	0

*Burned

Table B.2 Charcoal Composition of Flotation Samples, 41EP2611.

Provenience:	FS 7 Feature 1 Level 3	FS 16 Feature 1 Level 2	FS 21 Feature 6 Level 2	FS 23 Feature 7 Level 1	Total Percent
Taxon					
Atriplex/Sarcobatus saltbush/greasewood					
Number			6		8%
Weight in grams			0.2		7%
Prosopis mesquite					
Number	20	20	14	19	91%
Weight in grams	0.3	1.0	0.8	0.4	93%
Undetermined non-conifer					
Number				1	1%
Weight in grams				<0.05	n.a.
TOTAL NUMBER	20	20	20	20	100%
TOTAL WEIGHT	0.3g	1.0g	1.0g	0.4g	100%

DISCUSSION AND SUMMARY

Plant taxa recovered at 41EP2611 included several species (beeweed, purslane, pigweed, and pricklypear cactus) frequently cited among food products utilized in the Southwest in the prehistoric or historic past. Of these, however, only pricklypear cactus seeds were charred, and thus reliably linked to the prehistoric occupation. Several species of pricklypear grow within easy gathering range of the site; all produce mature fruits with a substantial carbohydrate content in late summer. Two taxa with negligible economic utility (scorpionweed and seepweed) were also recovered at this site; these are easily classified as contaminants.

Charred cactus seeds (pricklypear and/or hedgehog cactus) have been recovered at several other Chihuahuan Desert sites (O'Laughlin 1980; Struever 1980; Toll 1982, 1986, 1987a). Cacti and other perennial species (yucca, mesquite) providing high-calorie food reserves concentrated in larger fruits seem to be more prominent among flotation and macrobotanical assemblages of Chihuahuan Desert sites, compared to sites farther north along the Rio Grande Valley or on the Colorado Plateau. Economic weeds are generally less diverse, less ubiquitous, and less numerous. Perennial species with edible food reserves are a more conspicuous part of the southern landscape; energetics favor their collection where they are available.

Charcoal at the site was almost entirely mesquite (91% by number, 93% by weight) with a minor component of saltbush/greasewood. This general assemblage is found over and over again at sites in southern New Mexico/west Texas (Toll 1986, 1987a, 1987b, 1987c, etc.). Mesquite, a very dense wood, is the logical preferred fuel and manufacturing material where available. Where oak grows in substantial amounts in southern New Mexico, it is also selected (e.g., Toll 1987c).

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APPENDIX C:

Petrographic Analysis of Twelve Sherds
from Site 41EP2611, El Paso, Texas

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Introduction

Twelve sherds were selected for petrographic analysis by Dr. Amy Earls of Mariah Associates, Inc. from the artifactual component of site 41EP2611 located in southeastern El Paso, Texas. All samples are either jar rim or jar body sherds. The ceramic types included: El Paso Brown (3), El Paso Polychrome (3), plain buff/orangeware (1), plain brownware (1), plain buffware (10), Chupadero Black-on-White (2), and whiteware (1).

This petrographic examination of tempering material and certain attributes of the clay matrix was conducted in order to ascertain answers to the following questions:

1. Are the ceramics of local or nonlocal manufacture based on the availability of the tempering materials present in the ceramics?

2. Is there any variability in the size, composition or abundance of tempering material present in the El Paso Brown and the El Paso Polychrome samples?

3. How does the tempering material in the ceramics from 41EP2611 compare with that found in ceramics from the Santa Teresa, NM, excavation?

Methodology

The twelve samples underwent thin sectioning at the Geology Department, University of New Mexico, using standard techniques. Following thin section preparation the twelve samples were examined using a petrographic microscope, an instrument that utilizes polarized light. In addition to polarized light certain optical devices on the microscope allow identification and measurement of the tempering materials used by the prehistoric potter.

Tempering material was added to raw clay to aerate the clay in order to avoid cracking of the vessels as the water in the clay heated to steam during firing. Most tempering material is of geologic origin (crushed rock fragments, minerals, sand), or is of a cultural material (crushed fragments from previously fired ceramic items).

When the tempering material is of geological origin it is identified and then can be compared to the geologic material occurring at or in the vicinity of the site from which the ceramic items were recovered. This information allows inferences to be made as to whether the ceramics were produced in the site under investigation or were manufactured elsewhere.

Because clay minerals such as kaolinite, illite or montmorillonite are less than 0.0039 mm in size they are too small to allow petrographic identification. The identification of specific clay minerals requires methods such as X-ray diffraction or neutron activation.

However, four observations regarding the clay matrix may be made. The first is the siltiness of the raw clay, whether it contains an abundance or a relatively sparse amount of silt sized (0.0039 mm to 0.0625 mm) material. The second observation involves the texture of the clay matrix as viewed in unpolarized light. Sometimes the clay matrix has a smooth, even appearing texture, whereas at other times the clay matrix has a thick-and-thin, uneven appearing texture. The former attribute is labelled "homogeneous", and the latter is labelled "mottled". The reason for these two differences in texture is unclear. Either the clay contains some inherent property or the potters used differing techniques during ceramic manufacture. Because the texture of the clay matrix appears to be more or less consistent within a ceramic type perhaps the first explanation is the more plausible of the two.

The third observation is the color of the clay matrix as viewed in plain light, and the fourth is the presence of small particles of carbonaceous material incorporated into the raw clay during deposition of the clay body.

The following data were recorded for each thin section:

1. The type of rock fragments, mineral species or presence of sherd fragments, their maximal size and relative abundance as tempering material,

2. Whether or not carbonaceous material is present in the clay,

3. The siltiness of the clay, whether abundant or sparse in amount,

4. The estimated percentage of tempering material present in the thin section,

5. The color of the clay in unpolarized light, and

6. The textural appearance of the clay matrix.

Following the recording of the above data for each of the twelve sherds examined, the ceramic type and provenience were added to each data recording sheet, one for each sample, and a table summarizing the data was constructed (see Table C.1).

Surface Geology of the Site Area

The site 41EP2611 is located on the lowest terrace of the Rio Grande in an area of both active and stabilized sand dunes. The surface geology of the surrounding area consists of Quaternary age alluvial deposits indicating an erosional cycle.

Discussion of Findings

El Paso Brown (Samples #1, #4, #6)

These three thin sections are tempered with crushed monzonite (see Table C.1), an igneous rock intermediate in composition between a granite rock on one end and a basaltic rock at the other end. The maximal size of the rock fragments is very coarse-to-granule-sized (1.0 mm to 2.3 mm). Green horn-

Table C.1 Petrographic Data for Twelve Ceramic Items from 41EP2611, El Paso, Texas.

Thin Sect. No.	Sample Identification Number	Ceramic Type	Tempering Material: Type	Tempering Material: Abundance	Tempering Material: Max. Size in mm	Ferromagnesian Minerals	Carbonaceous Material Present	Abundance of Silt Sized Material	Color of Clay Matrix Plain Light	Texture of Clay Matrix	Estimated % of Temper	Provenience
1	FS-1	El Paso Brown	Crushed Monzonite	Ab.	1.5	Green Hornblende	Too Black To See	Abundant	Black	Mottled	40	Area 2; Surface
2	MO	El Paso Polychrome	Crushed Monzonite	Ab.	1.5	Green Hornblende	Too Black To See	Abundant	Black	Mottled	40	Area 9; Feature 6; Surface
3	FS-13	Plain Buff/Orangeware	Sand Temper	Ab.	1.0	Muscovite	None	Abundant	Brown	Homogeneous	40	Area 9;
4	FS-4	El Paso Brown	Crushed Monzonite	Ab.	2.3	Green Hornblende	Too Black To See	Abundant	Black	Mottled	30	Area 11; Surface
5	FS-5	El Paso Polychrome	Crushed Monzonite	Ab.	1.3	Magnetite Green Hornblende	None	Abundant	Black	Mottled	45	Area 2; Surface
6	FS-6	El Paso Brown	Crushed Monzonite	Ab.	1.0	Magnetite Green Hornblende	None	Abundant	Brown Black	Mottled	35	Near Feature 1; Surface

Table 1 (continued)

Thin Sect. No.	Sample Identification Number	Ceramic Type	Tempering Material: Type	Tempering Material: Abundance	Tempering Material: Max. Size in mm	Ferromagnesian Minerals	Carbonaceous Material Present	Abundance of Silt Sized Material	Color of Clay Matrix Plain Light	Texture of Clay Matrix	Estimated % of Temper	Provenience
7	FS-7	Whiteware	Crushed Quartz Monzonite	Ab.	1.5	Green Hornblende	Too Black To See	Abundant	Black	Mottled	45	Area 2; Surface
8	FS-8	Plain Brownware	Crushed Syenite	Ab.	0.7	Magnetite Green Hornblende	None	Abundant	Dark Brown	Mottled	40	Area 6; Surface
9	FS-9	Plain Buffware	Crushed Syenite	Ab.	0.5	Magnetite Green Hornblende	None	Abundant	Dark Brown	Mottled	45	Area 6; Surface
10	FS-10	Chupadero B/W	Sherd Temper	Ab.	0.6	None	Present	Sparse	Light Brown	Homogeneous	20	Area 9; Surface
11	FS-11	El Paso Polychrome	Crushed Monzonite	Ab.	1.5	Green Hornblende	To Black To See	Abundant	Black	Mottled	35	Area 9; Surface
12	FS-12	Chupadero B/W	Sherd Temper	Ab.	0.5	None	Present	Sparse	Brown	Homogeneous	20	Area 9; Surface

Ab. = Abundant Amount

blende is present in all of the samples, and magnetite is present in Sample #6. Possibly magnetite is present in the other two thin sections, but the extreme blackness of the clay matrix did not permit observation. The estimated amount of temper ranges from 30% to 40%, a fairly heavily tempered ceramic type. The clay matrix in all three samples has an abundant amount of silt sized material, and all display a mottled texture. The color of the clay matrix in plain light ranges from a dense black to a brown black. There is so little variability in the composition and size of the tempering material and in the attributes of the clay matrix that all three ceramic items appear to have been made in the same manufacturing location.

The monzonite used as the tempering material does not appear to be a locally occurring outcrop. The geological map indicates that monzonite could possibly be found in the vicinity of the Organ Mountains 60 to 65 km to the north. The eastern flank of these mountains consists of igneous intrusives of Tertiary age that contain rocks of intermediate composition. Monzonite is one of several igneous rocks of intermediate composition. Because monzonite does not outcrop within a 15 to 20 km radius of the site, it is reasonable to assume that the ceramics were not locally made.

El Paso Polychrome (Samples #2, #5, #11)

These three thin sections are tempered with crushed monzonite (see Table C.1), the same tempering agent used by the potters who made the El Paso Brown ceramics. The maximal grain size of the rock fragments is in the coarse-grained size range (1.3 mm to 1.5 mm). Green hornblende is present in all three thin sections, and magnetite is present in Sample #5. The estimated amount of temper ranges from 35% to 45% indicating a fairly heavily tempered ceramic. The clay matrix in all three thin sections contains an abundant amount of silt sized materials, and all display the mottled thick-and-thin appearing texture. The color of the clay matrix as seen in plain light is black in all three items.

The variability in tempering composition and maximal size of the tempering grains along with the attributes of the clay matrix are so minor that it is safe to infer that the three ceramic items share a common manufacturing location. In addition, these El Paso Polychrome samples share the same tempering and clay body characteristics as do the El Paso Brown ceramics, indicating that both ceramic types were produced in the same manufacturing location using the same temper and clay sources.

As discussed previously, the monzonite used as the tempering agent to aerate the clay was not locally available to the inhabitants of 41EP2611, thus allowing the inference to be made that the ceramics were made elsewhere.

Plain Buff/Orangeware (Sample #3)

This thin section is sand tempered. The sand is made up of quartz grains whose most abundant size is 0.3 mm to 0.4 mm. A few grains are as large as 1.0 mm. In addition, the sand contained angular fragments of muscovite ranging in size from less than 0.1 mm to 0.3 mm. The estimated percentage of tempering material is 40%. The clay matrix contains an abundance of silt sized material, which is brown in plain light and has a smooth, homogeneous appearing texture.

Sand was readily available to the inhabitants of the site, but only a petrographic comparison of the locally available sand could give the information needed to state whether or not this ceramic item was locally made. Neither the tempering material nor the clay matrix match the characteristcs found in the El Paso Brown and the El Paso Polychrome, thus implying a different area of manufacture from these two ceramic types.

Plain Brownware (Sample #8)

This ceramic item is tempered with crushed syenite that has a maximal grain size of 0.7 mm. Syenite, an igneous rock of intermediate composition, grades into granite on one hand and monzonite on the other hand. Syenite occurs as small intrusives or dikes and as border facies of large granitic bodies.

Syenite outcrops in the Hueco Mountains some 35 km distant (Fields and Girard 1983:182). The collection of rock specimens from this area followed by a petrographic comparison of the rock and the tempering material would be required to state whether or not the Hueco Mountains is the source of the tempering agent in this ceramic type. However, it is clear that the ceramic item is not locally made.

Plain Buffware (Sample #9)

This thin section is syenite tempered, but the absence of microcline in the mineral composition of the syenite makes it different enough from the previous sherd to infer manufacture in a different location. The maximal grain size is 0.5 mm, and like Sample #8, Sample #9 contains green hornblende and magnetite. As in the previous discussion the syenite was not locally available; therefore, this ceramic item was made elsewhere than the site under consideration.

Chupadero Black-on-White (Samples #10, #12)

Both these ceramic items are tempered with crushed sherd fragments from what was previously some type of utility ware. Both samples are alike in the presence of sherd fragments and the maximal size of the tempering grains. The clay matrix in both items has a relatively sparse presence of silt sized material, contains carbonaceous material, and is a brown color in plain light, and both have a homogeneous, smooth appearing texture.

The similarity of the tempering materials and clay matrix suggests a common area of manufacture. Broken utility fragments are available in almost all habitation sites so that it is not possible to state categorically whether or not these ceramic items were produced at the site.

Whiteware (Sample #7)

This thin section is tempered with crushed quartz monzonite, having grains with a maximal size of 1.5 mm. Green hornblende is present. The presence of quartz makes it a quartz monzonite and, like the monzonite and syenite previously discussed, an igneous rock in the intermediate composition range. It originates in the same way.

Because this rock was not locally available, it may be inferred that the ceramic item was not locally made. The clay matrix has the same attributes as those found in the El Paso Brown and the El Paso Polychrome ceramics so that it appears possible that all share a common, perhaps widespread, clay source.

Comparison of Site 41EP2611 Ceramics and Unspecified Brownware Ceramics from Santa Teresa, NM

The petrographic examination of 36 unspecified brownware sherds from Santa Teresa, NM previously analyzed by the author revealed that 33 were tempered with monzonite and the remaining three were tempered with quartz monzonite, whereas six of the El Paso site are monzonite tempered and one is tempered with quartz monzonite. Santa Teresa is located west of the Rio Grande across from northwestern El Paso.

These two sites of monzonite tempered ceramics do contain many similarities. Green hornlende occurs in both suites, and both have clay matrices with an abundant amount of silt sized material, and a mottled thick-and-thin appearing texture. In both sets of ceramics, the estimated percentage of temper is in the 40% to 45% range. One minor difference is that approximately one-half of the Santa Teresa sherds contain the mineral hematite. Most probably the hematite is the result of oxidation of an iron bearing mineral during firing. It is highly probable that both suites of ceramics originated in a common area of manufacture.

Comparison of Chupadero Black-on-white Ceramics From 41EP2611 and Similar Ceramics from Capitan, NM Area Sites.

The petrographic examination of 45 Chupadero Black-on-white ceramics from sites in the Capitan, NM, area revealed that 42 sherds are tempered with crushed syenite, a rock that is locally available. The remaining three sherds were tempered with sherd fragments, sand, and quartz monzonite. This appears to suggest that the one sherd tempered item was not made locally.

The sherd tempered Capitan ceramic and the two 41EP2611 ceramics share the same clay matrix characteristics, and it is entirely possible that they share a common manufacturing area somewhere in southern New Mexico.

Conclusions

This petrographic analysis has revealed that the El Paso Brown ceramics and the El Paso Polychrome ceramics appear to share a common area of manufacture. Both are tempered with monzonite, an igneous rock of intermediate composition. This rock does not outcrop in the site area so that the inference may be made that these ceramics were not locally produced.

The one whiteware sample is tempered with fragments of quartz monzonite, a rock that does not outcrop in the site area. This ceramic was not locally made.

Both the plain brownware and the plain buffware are tempered with crushed syenite. Syenite, monzonite and quartz monzonite are all igneous rocks of intermediate composition that occur either as small intrusives or facies on the border of quartz rich granitic rocks. These two plainwares appear to be of nonlocal manufacture.

The remaining three sherds are sand tempered (one plain buff/orangeware sample) and two sherd tempered Chupadero Black-on-white samples. Both sand and broken ceramic fragments were available to the potters in the El Paso site so that it is not possible to designate their manufacturing location with any degree of certainty.

The El Paso sherds tempered with monzonite appear to share a common area of manufacture with unspecified brownware sherds from sites in the Santa Teresa, NM area. The two sherd tempered Chupadero Black-on-white ceramics share characteristics with a similarly tempered ceramic item found in the Capitan, NM area. Most probably they share a common manufacturing location closer to El Paso than the Capitan area.

In conclusion, it appears from this petrographic analysis that a large percentage of the ceramics found at site 41EP2611 in southeastern El Paso were manufactured elsewhere and brought into the study area.

Appendix D

Surficial Geology and Environmental Overview of Site 41EP2611

Southeast El Paso Cultural Resources Assessment

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Surficial Geology and Environmental Overview of Site 41EP2611, El Paso Southeast Cultural Resource Assessment

By

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The El Paso SE Cultural Resource Assessment project area is located in southeastern part of that west Texas city. This report focuses on archeological site 41EP2611, located south of Interstate 10, just north of North Loop Road and between Zaragosa Road and Loop 375. This area is located on the Ysleta 7.5' Quadrangle, El Paso County, Texas.

In this report, the investigators will provide a regional geomorphic setting, a description of site 41EP2611, a description of the surficial deposits, a discussion of the relationship of the archeological features to the site and they will discuss the site in the context of the regional environmental history.

The findings of this report are based on field observations conducted at the site, grain size analysis conducted in a laboratory, air photo analysis, and a review of the relevant literature. The grain size analyses were performed on 23 soil samples taken from 3 backhoe trenches located at the site.

Physical Characteristics of Site 41EP2611

Geomorphology

In the regional context site 41EP2611 is located in the El Paso basin immediately east of the modern floodplain of the Rio Grande. The El Paso basin is the northwestern part of the Hueco Bolson which is one of a number of tectonic basins formed by normal, tensional faulting during the last 20 million years. The Hueco Bolson extends from the Franklin Mountains and Sierra Juarez in the northwest to the Hueco Mountains, Quitman Mountains, and Sierra de la Amargosa to the east and southeast.

Until middle Pleistocene time the Hueco Bolson was one of a series of closed basins which formed the sump for the Rio Grande drainage in Colorado and New Mexico (Strain, 1970). About 300,000 to 500,000 B.P. the Rio Grande overtopped its drainage divides and linked up with the lower Rio Grande near Presidio, Texas. Since that time the Rio Grande has been a through flowing stream. The alternation between glacial and interglacial climates has caused the Rio Grande to alternately cut and partially refill its river valley thereby forming a series of river terraces along its course. The highest terrace, the La Mesa, represents the elevation of the Rio Grande at the initiation of its through flowing course. The modern floodplain is approximately 8,000 years old (Table 1) (Gile et al, 1981). The terrace surfaces have been dissected and in part destroyed by ephemeral streams flowing to the lower base levels produced by the entrenchment of the Rio Grande. This zone of dissected terraces is called the "Valley Border" by Gile et al (1981).

Site 41EP2611 extends from the edge of the historic floodplain at approximately 3670 ft (1120 m) up into the Valley Border zone to approximately 3710 ft (1140 m). In this vicinity the elevation of the highest terrace surface, the La Mesa, is at approximately 4000 ft. (1220 m). Most of the site west of the barbed wire fence has been bulldozed into a series of manmade terraces each of which is approximately 10 ft (3 m) high. East of the fence the gently sloping surface is mantled with active eolian sand which forms a continuous sand sheet with coppice dunes up to 3 ft (1 m) high around perennial shrubs. Except for the silty flood plain deposits at the lowest portions of the site, the entire bulldozed area is underlain by weakly indurated fine/medium eolian sand.

Table 1. Geomorphic surfaces and deposits in the Las Cruces and El Paso areas (Gile et al, 1981; Holliday, 1983).

Age	Las Cruces Region	El Paso Region
Holocene	Fillmore	lower terrace sequence
	Fort Selden	
10,000 B.P.	Leasburg	
Pleistocene	Picacho (25,000 B.P.)	Gold Hill
	Tortugas (75,000-125,000 B.P.)	Kern Place
	La Mesa (300,000-500,000 B.P.)	La Mesa

The modern Rio Grande floodplain deposits are mapped as Harkey loam, Harkey silty clay loam, and Sineli silty clay. The eolian Valley Border deposits are mapped as Bluepoint association, rolling (Jaco, 1971). In the bulldozed portions the surface has a discontinuous covering of pioneering herbs and grasses. The unbulldozed zone east of the fences has scattered mesquite (<u>Prosopis glandulosa</u>), creosote (<u>Larrea tridentata</u>), gray thorn (<u>Candalia</u>), Mexican blue wood (<u>Crucillo</u>), bunch grasses, and ephemeral herbs.

Surficial Deposits

Three backhoe trenches were dug at the site, with two of these, trenches 1 and 2, trending north-south, located in undisturbed surface on the eastern edge of the site, while the third trench, trending east-west, was made close to the southern boundary of the site. Trench 1, the northernmost trench, was approximately 12 ft (3.5 m) in length; trench 2, located just south of trench 1, had an approximate length of 8 ft and trench 3, located 1,000 ft (300 m) to 1,200 (400 m) south-southwest of the first two trenches, had an approximate length of 225 ft (70 m). Stratigraphic profiles of trenches 1, 2, and 3 can be found in Figures 1, 2, and 3, respectively. Partial soil nomenclature descriptions are listed in Table 2; the soil colors shown in the table and discussed throughout this report are Munsell <u>in situ</u> colors (dry).

Figure 1 Stratigraphic Profile of Backhoe Trench 1.

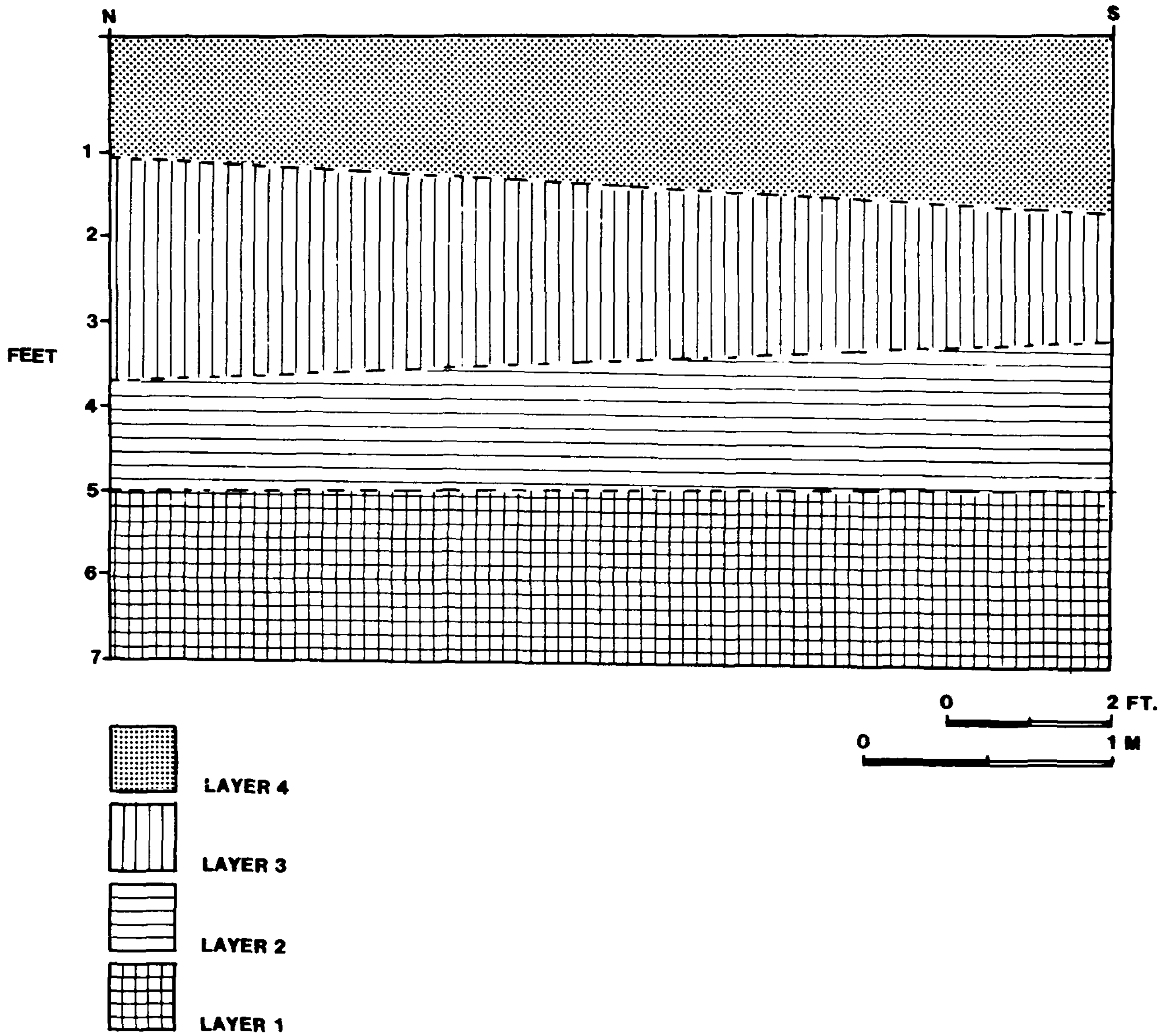


Figure 2 Stratigraphic Profile of Backhoe Trench 2.

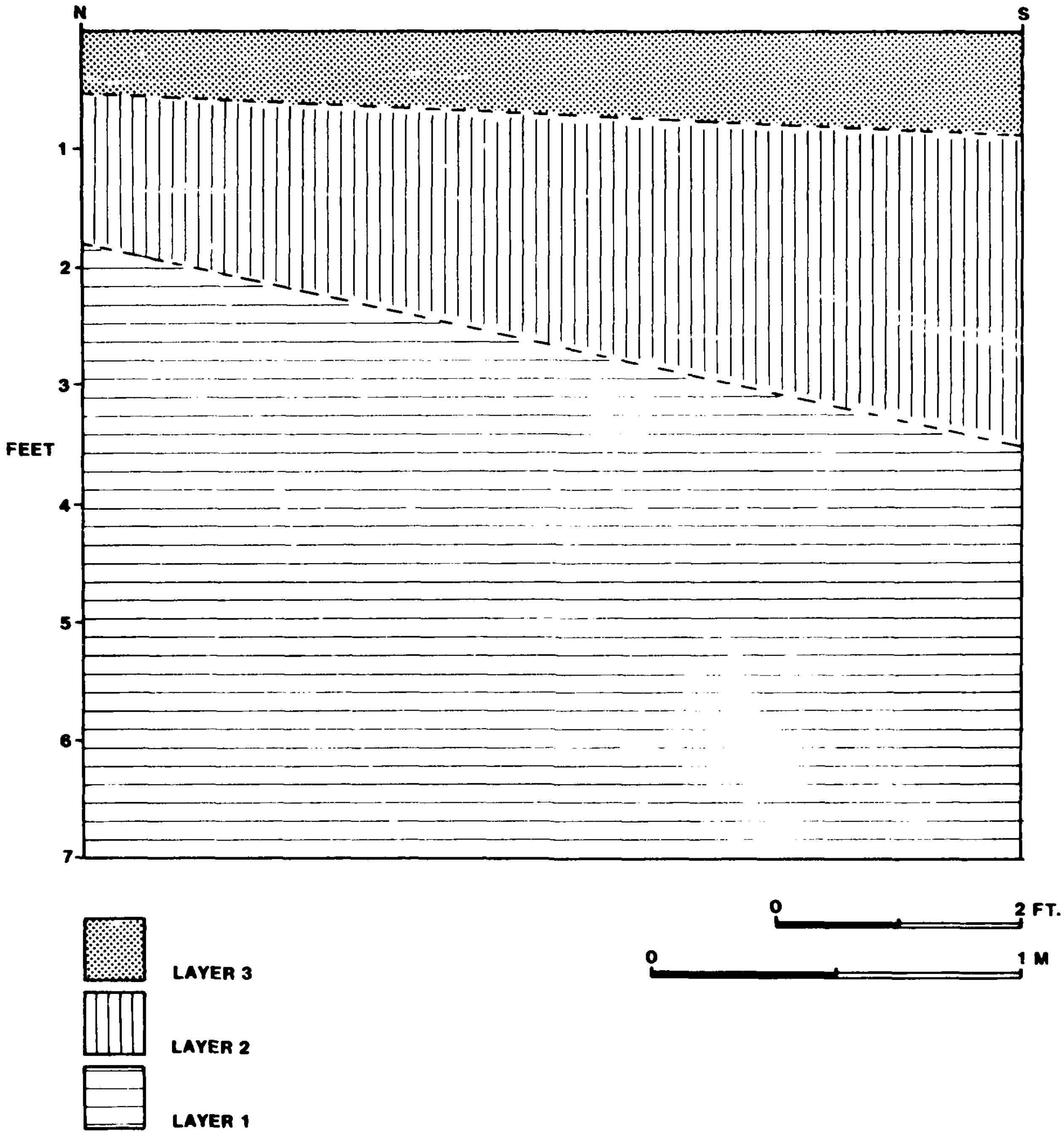
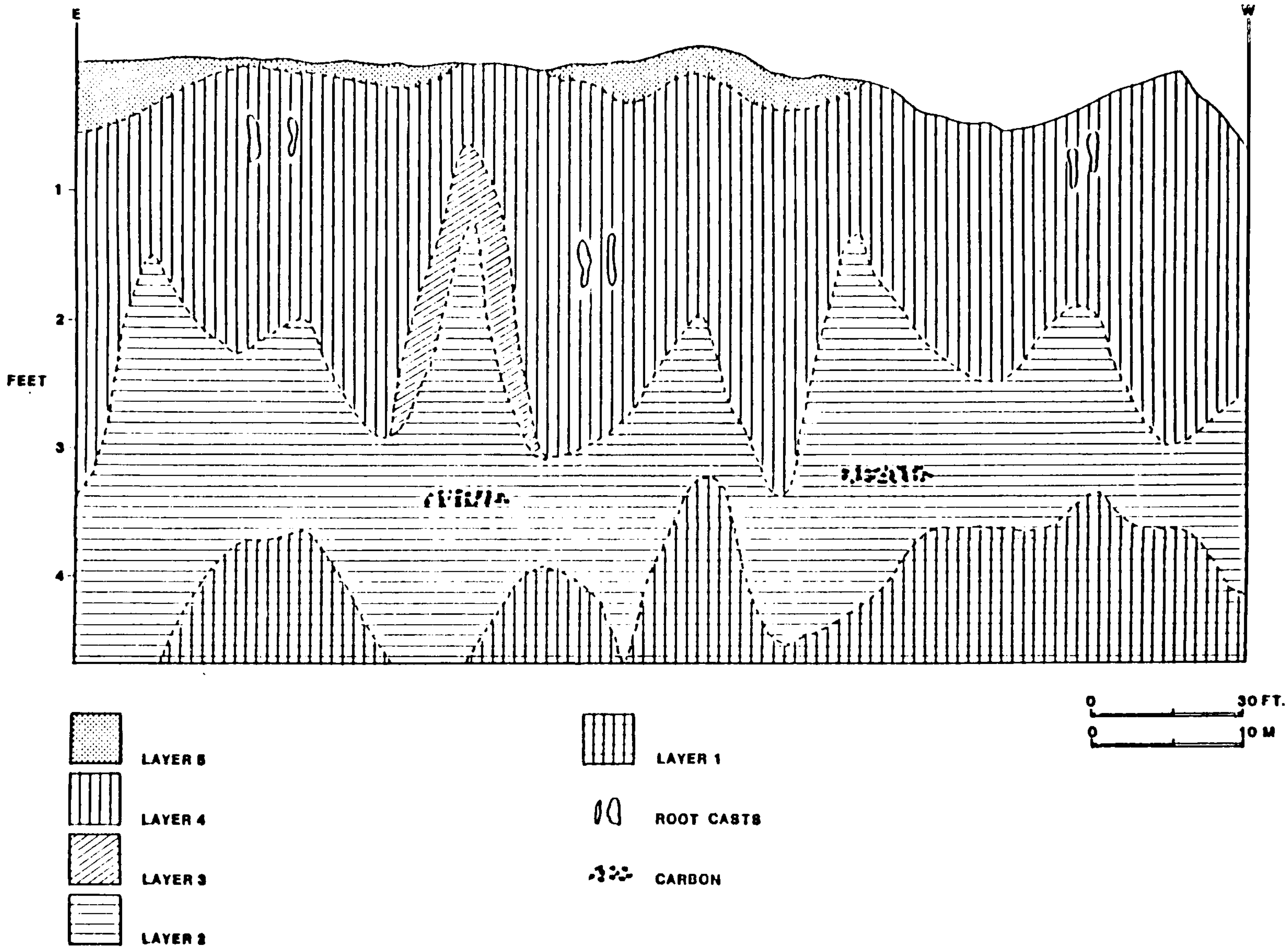


Figure 3 Stratigraphic Profile of Backhoe Trench 3 (vertical exaggeration = 30x).



The stratigraphy at site 41EP2611 is fairly straightforward; however, it is not totally uniform from a given backhoe trench to another. At most, there are five soil layers found in one area, trench 3 (fig. 3), while trench 2 (fig. 2) contains the fewest soil layers, 3; there are four soil layers found in trench 1 (fig. 1). For each trench the grain size, color and consistency of each layer were noted and permitted the investigators to correlate the soil layers from trench to trench.

Trench 1 (fig. 1) displays four distinct layers. Layers 1 and 2 (layer 1 the oldest), at depths of 5.5 ft (1.7 m) to 7.6 ft (2.3 m) and 3.8 ft (1.2 m) to 5.5 ft (1.7 m) below the surface, are mainly composed of moderately sorted fine to medium grained sand (.125 to 0.5 mm), having a color of 7.5 YR 5/8 (strong brown) and a slightly hard consistence. These layers were also slightly calcified and indurated, containing calcium carbonate nodules and filaments. These characteristics are those ascribed to stage I or II of the carbonate classification scheme developed by Gile et al., (1981) in which stage I is the minimum amount of identifiable carbonate accumulation and stage IV has complete induration with laminar carbonate layers. The slight induration and occurrence of calcium carbonate nodules and filaments suggest that these layers are in stage I or II of the carbonate development classification of Gile et al., (1981). Layer 3, found 2.2 ft (0.7 m) to 3.8 ft (1.2 m) below the surface, is also composed of moderately sorted fine to medium grained sand, with a color of 7.5 YR 5/6 (strong brown) and a loose consistence. Layer 4, the active layer, extending below the surface to a depth of 2.2 ft (0.7 m), is composed mainly of horizontally laminated sand that is very fine to medium grained (0.0625 to 0.5 mm), with a color of 7.5 YR 6/4 and a loose consistence.

Table 2. Partial Nomenclature Descriptions of Selected Profiles

Layer	Depth (ft)	Munsell Color (dry)	Consistence	Boundary
Backhoe Trench 1				
4	0 - 2.2	7.5 YR 6/4	lo	gs
3	2.2 - 3.8	7.5 YR 5/6	lo	as
2	3.8 - 5.5	7.5 YR 5/8	sh	--
1	5.5 - 7.6	7.5 YR 5/8	sh	--
Backhoe Trench 2				
3	0 - .75	7.5 YR 6/4	lo	as
2	.75 - 3.2	7.5 YR 5/6	sh	as
1	3.2 - 7.0	7.5 YR 6/6	lo	as

Backhoe Trench 3

5	0 - .75	7.5 YR 6/2	lo	aw
4	.75 - 2.5	7.5 YR 6/6	sh	gw
3	1.0 - 3.0	7.5 YR 6/4	sh	gw
2	2.5 - 4.0	7.5 YR 6/4	sh	aw
1	4.0 - 5.0	7.5 YR 6/8	sh	

ABBREVIATIONS:

Consistence (dry): sh = slightly hard; lo = loose

Boundary : g = gradual; a = abrupt; s = smooth; w = wavy

Trench 2 (fig. 2) exposed essentially similar sediments to those found in trench 1 with the exception that there was no differentiation in the strata beneath the carbonate layer (layer 2 of trench 1). For trench 2, layer 1 consists of moderately sorted fine to medium sand with a color of 7.5 YR 6/6 (reddish yellow). Layer 2 at 0.75 (0.2) to 3.2 ft (1.0 m) below the surface was a moderately sorted fine to medium sand with a color of 7.5 YR 5/6 (strong brown) and slight carbonate induration. Layer 3 at the surface was similarly a moderately sorted fine to medium sand with a 7.5 YR 6/4 (light brown) color and no induration.

Backhoe trench 3 displays five different layers (figure 3). Layers 1 and 2, found at depths of 4.0 ft (1.2 m) to 5.0 ft (1.5 m) and 2.5 ft (0.8 m) to 4.0 ft (1.2 m), below the surface, are composed of unconsolidated material mainly in the form of fine to medium grained sand. However, layer 1 has a color of 7.5 YR 6/9 (reddish yellow), while layer 2 has a color of 7.5 YR 6/4 (light brown); both layers have a slightly hard consistence. Layer 2 also contains carbon in the form of discontinuous sheets 0.3 - 0.5 ft. (0.1-0.2 m) in thickness located about 3.5 ft (1.1 m) below the surface. Layer 3, found 1 ft (0.3 m) to 3 ft (0.9m) below the surface, is composed mostly of fine to coarse grained sand (0.125 to 1.0 mm), having a color of 7.5 YR 6/4 (light brown) and a slightly hard consistence. This layer represents poorly sorted eolian lag material. The next layer up, layer 4, is a calcified layer that lies 0.8 ft (0.2 m) to 2.5 ft (0.8 m) underneath the surface. This layer is composed of mainly very fine to medium grained sand, with a color of 7.5 YR 6/6 (reddish yellow) and a slightly hard consistence. Fairly abundant calcium carbonate nodules and filaments and a slightly indurated nature indicates that layer 4 is in stage I or II of carbonate development as given by Gile et al. (1981). A few root casts, probably from mesquite or creosote, are dispersed throughout layer 4. Layer 5, the active layer, extending from the surface to 0.8 ft (0.2 m) below the surface, is composed mostly of fine to very fine grained horizontally-laminated sand, having a color of 7.5 YR 6/2 and a loose consistence.

The investigators performed grain size analysis (Tables 3 and 4) on 23 samples taken from the various soil layers exposed in the three trenches. These samples were divided into 1/2 Ø intervals using the dry sieve method (figure 4). Overall, the samples were positively skewed, had some kurtosis and had a mode between 2 and 2.5 0 (0.25 and 0.1875 mm). Except for the soil unit, layer 1, trench 3, all the unconsolidated material had very low percentages of clay and silt (0 $\leq$ 4 or < 0.0625 mm). None of the layers contained secondary (<6%) maxima in the 0 to -1 1/2 0 (1 to 3.0 mm) interval.

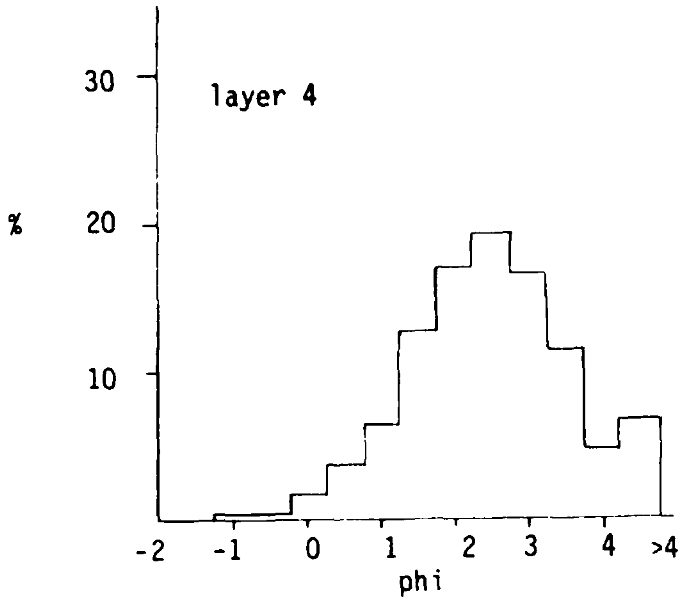
The grain size characteristics (fig. 4) for all of the soil layers, except layer 1 trench 3 indicate that they could either be eolian or fluvial deposits (Friedman, 1961, 1979; Blatt et al., 1980, p. 645; Wright and Honea, 1986). An eolian depositional environment for these deposits is supported by their topographic position above the modern floodplain, the buried undulating eolian dune surface with coarse sand lag deposits, and the absence of diagnostic horizontal sedimentary structures indicative of an overbank fluvial environment. As stated earlier, the source of these eolian sands was the floodplain of the Rio Grande which would have exposed a wide, dry, braided streambed during the spring windy season.

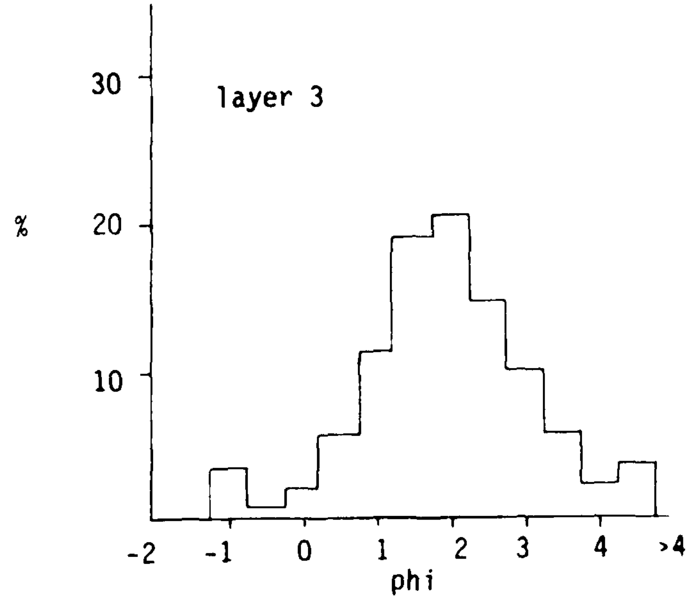
Based mainly on grain size and consistence, while not always taking the soil color into account, several of the layers can be correlated from trench to trench. The active layer (figs. 1, 2 and 3) is easily correlated from trench to trench; grain sizes match up nicely as do the consistences, although the color varies from the undisturbed surfaces--trenches 1 and 2, 7.5 YR 6/4, to the disturbed surface--trench 3, 7.5 YR 6/2.

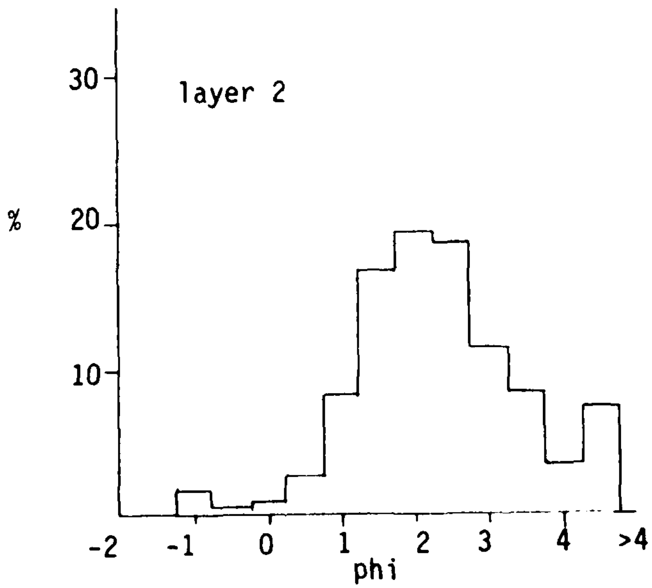
The most easily correlated layer is that of the calcified units below the active layer (fig. 1, 2, and 3). The grain sizes are very similar in these units from trench to trench and they are all slightly indurated; while the colors match up fairly well from trench 1 to trench 2--7.5 YR 5/8 and 7.5 YR 5/6, respectively--the color of the calcified layer exposed in trench 3 is 7.5 YR 6/6, or a little lighter in color than the others. This could mean that the calcified layer in trench 3 is a little younger than the other calcified layers, however, this is unlikely because all of the other characteristics match up so well. There is a former dune sand surface exposed in trench 1--layer 3 within the trench--(fig. 1) separating the active layer from the calcified layers below. This former dune sand surface thins to south as exposed in trench 1 and it pinches out before the area where trench 2 was dug.

Below the indurated carbonate layer is a zone of unconsolidated sand. Layer 1 of trench 2 and layer 2 of trench 3 (fig. 2 and 3) are very similar in grain size and color--7.5 YR 6/6 and 7.5 YR 6/4, respectively--and they are both somewhat poorly sorted.

In trench 3, there are two units that do not correlate with units in the other trenches (fig. 3). A discontinuous eolian lag layer located about 150 ft (46 m) from the west end of the trench, between the calcified layer above and an unconsolidated unit below, has no stratigraphic equivalent in either trench 1 or 2. The other layer is the lowermost, or oldest unit exposed in the trench (figure 3). This unit, layer 1, is comprised of unconsolidated silty material that is somewhat discontinuous which means that it pinches out and then returns.







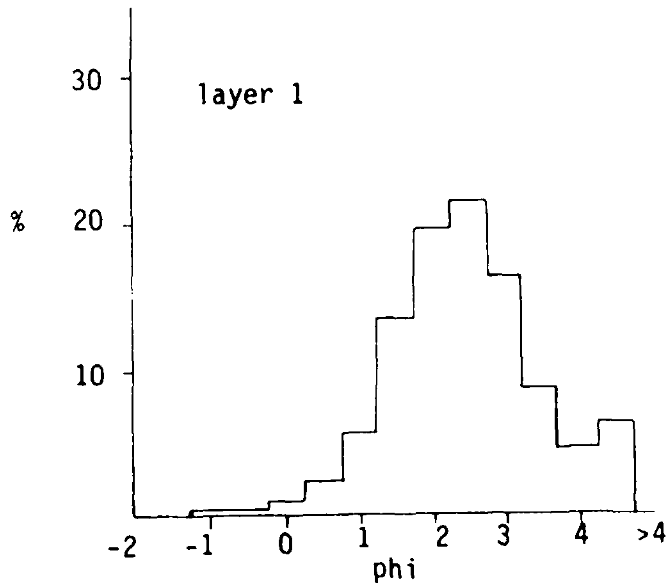
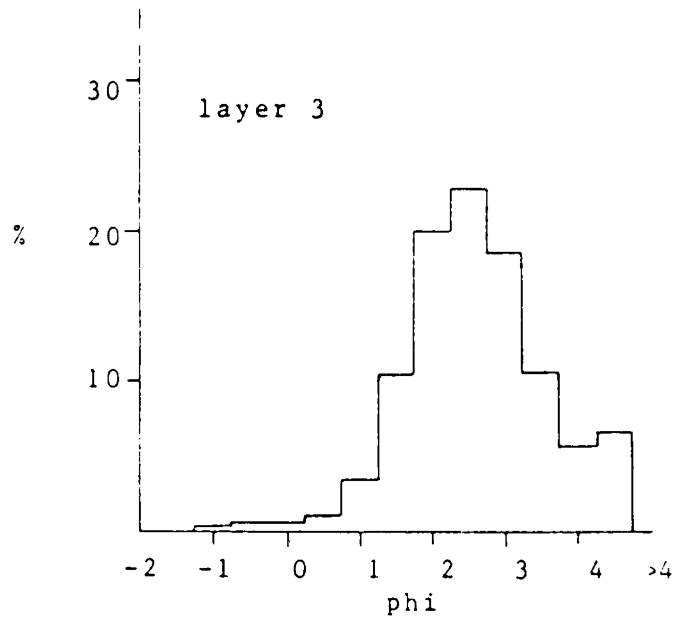
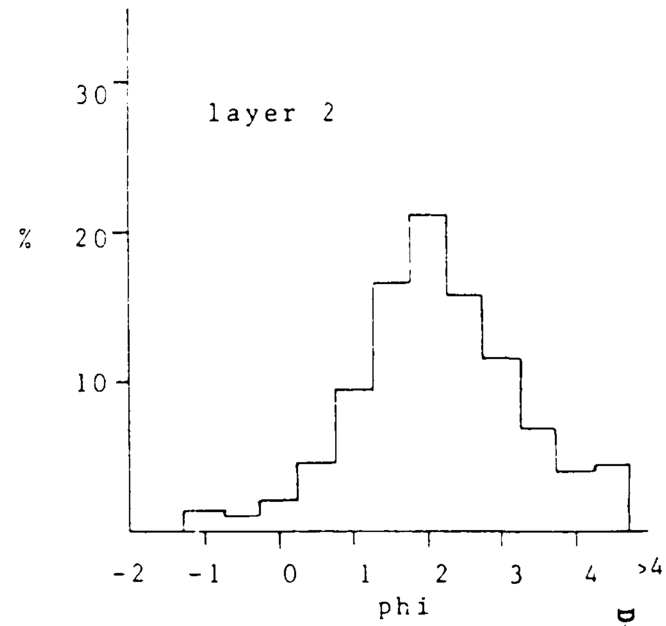
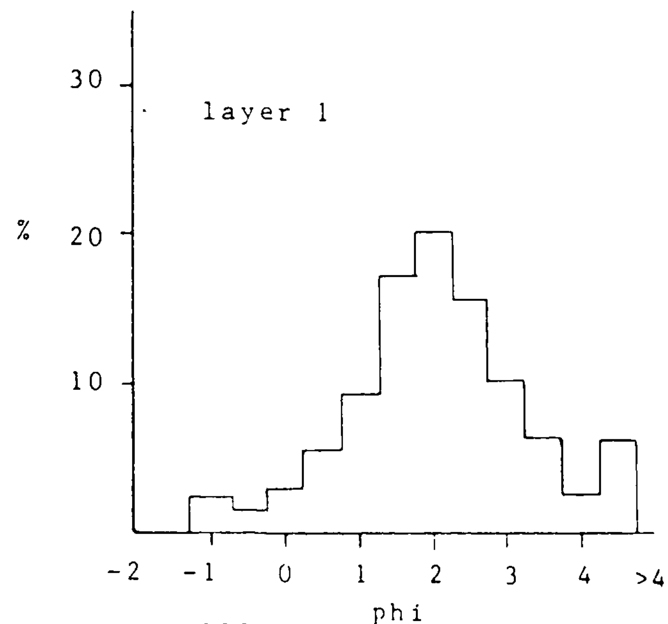


FIGURE 4. Grain size analysis from soil layers in backhoe trenches 1, 2, and 3.

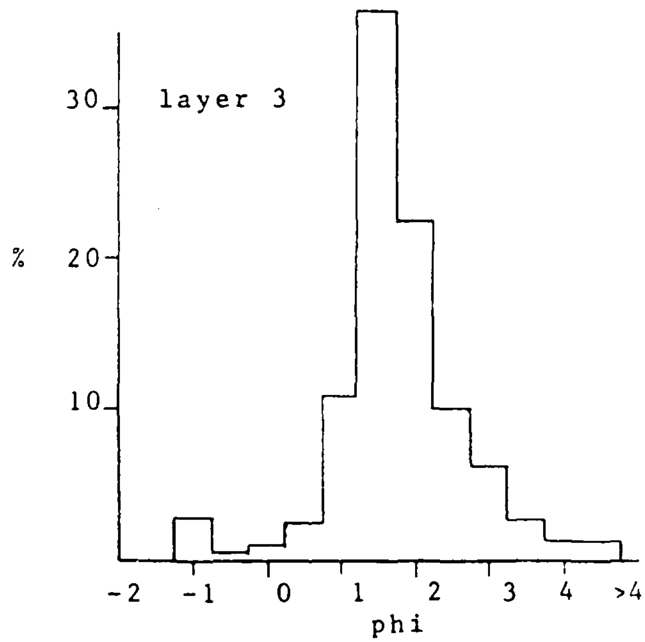
Trench 1

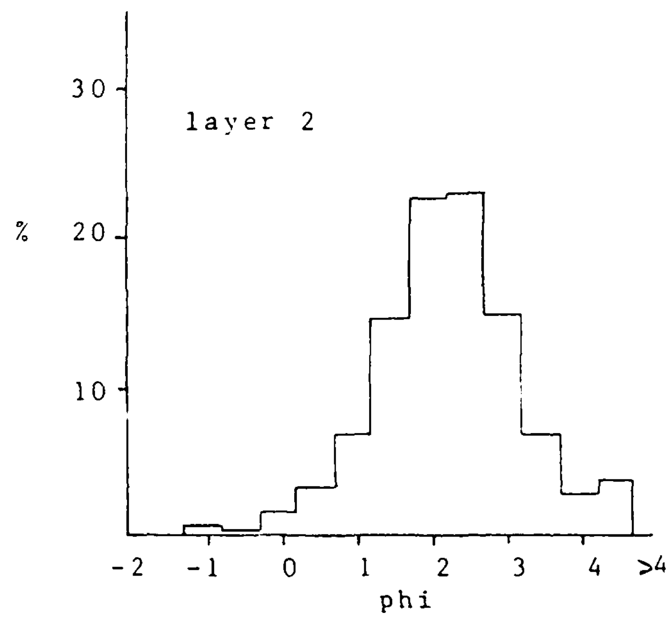

layer 3
%
30
20
10
-2
-1
0
1
2
3
4
>4
phi


layer 2
%
30
20
10
-2
-1
0
1
2
3
4
>4
phi


layer 1
%
30
20
10
-2
-1
0
1
2
3
4
>4
phi

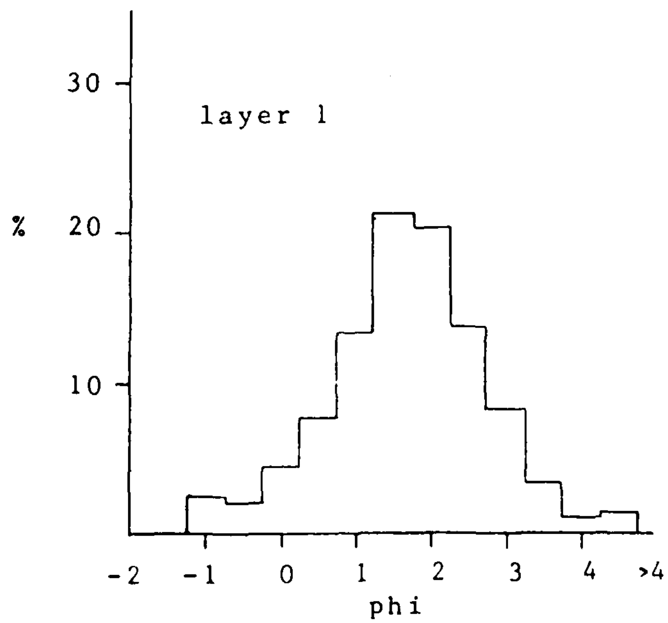
Trench 2

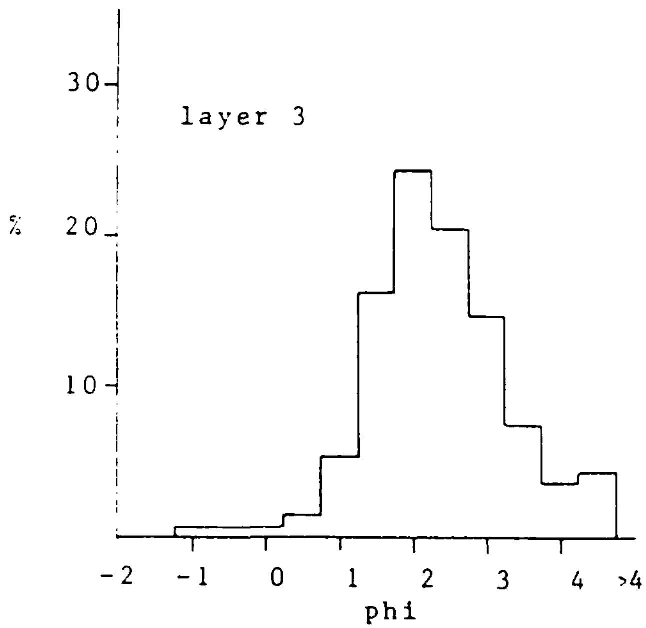


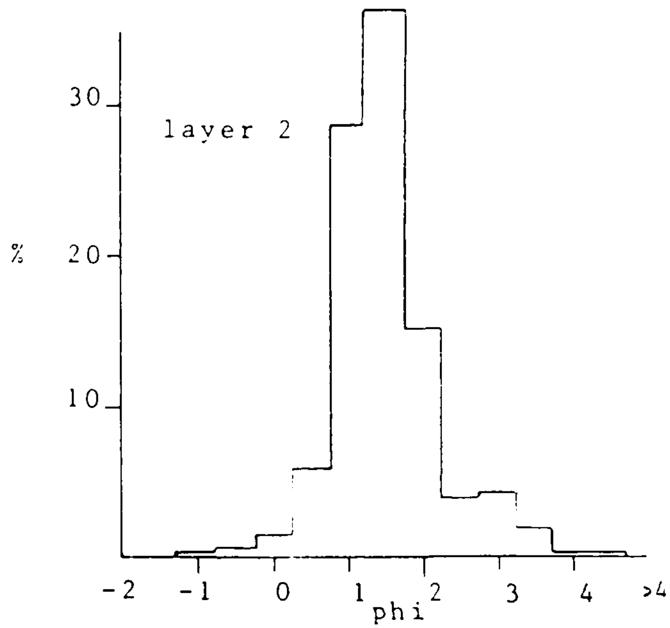


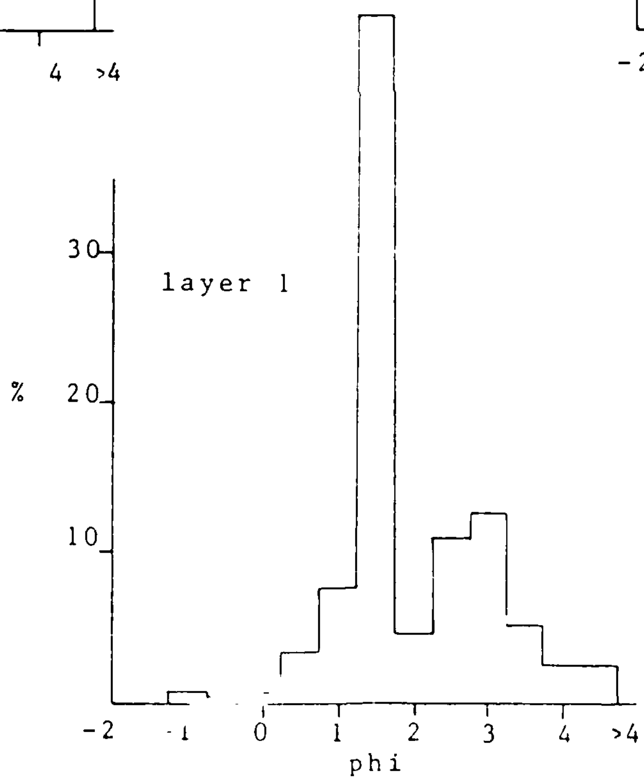
<u>Trench 3</u>

<u>west end</u>



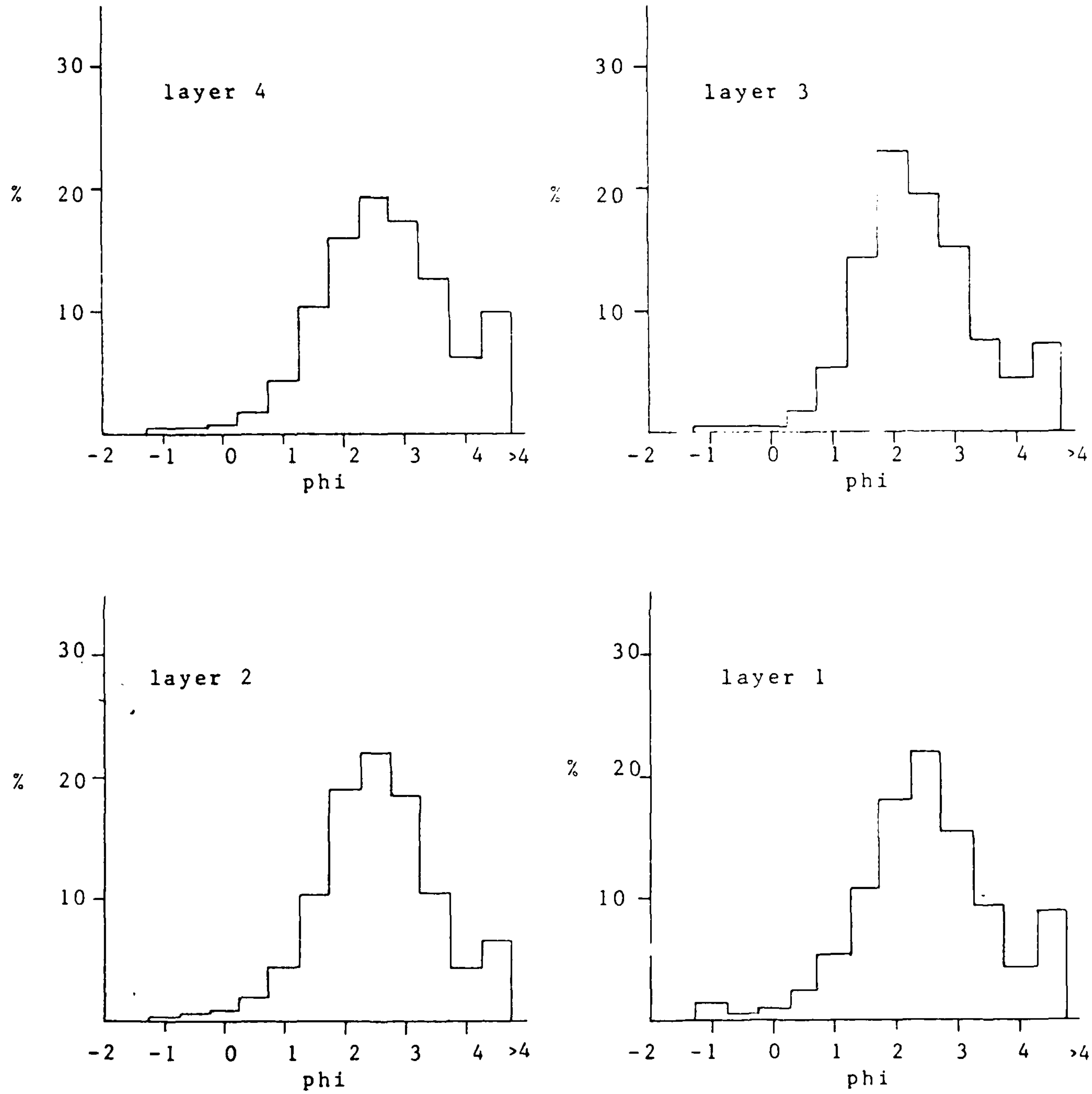




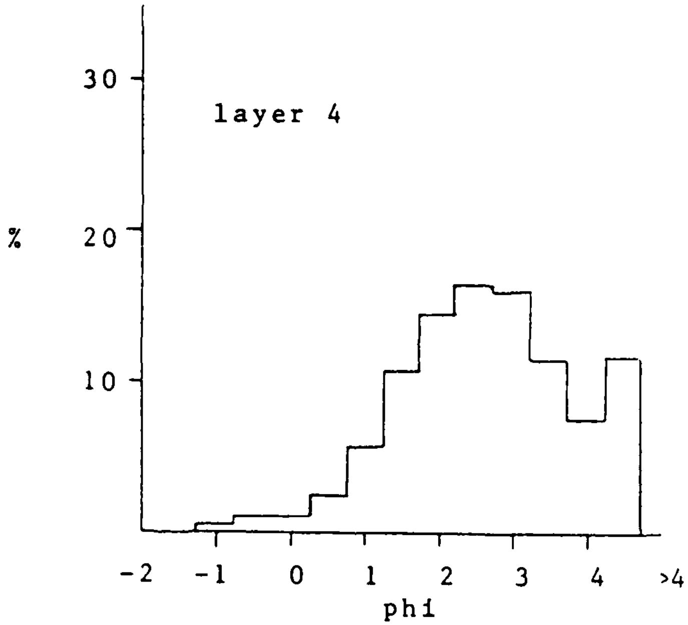


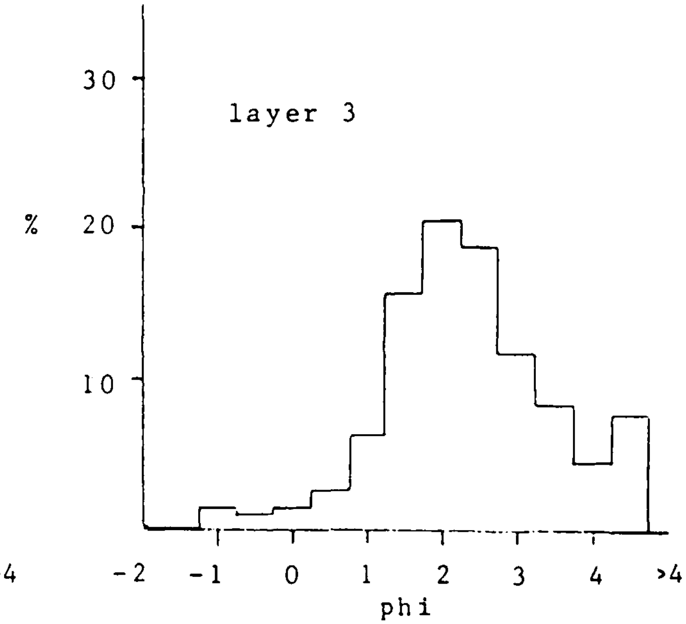
Trench 3

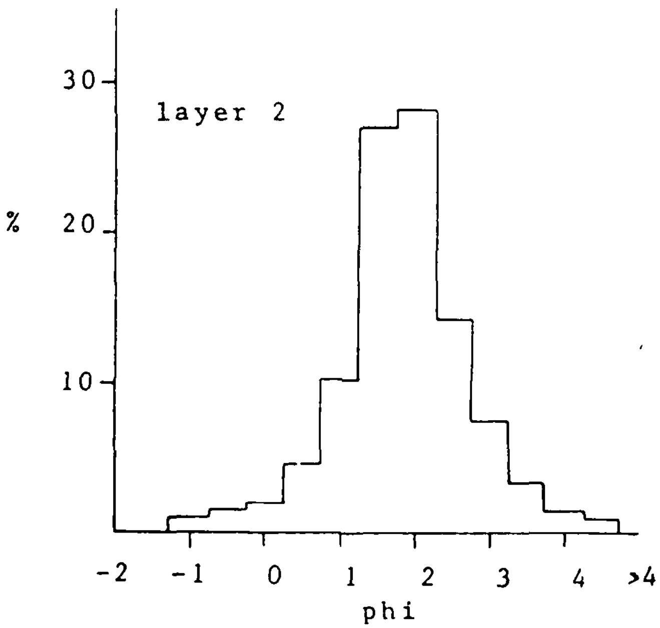
45 feet from west end



Trench 3- 90 feet from west end

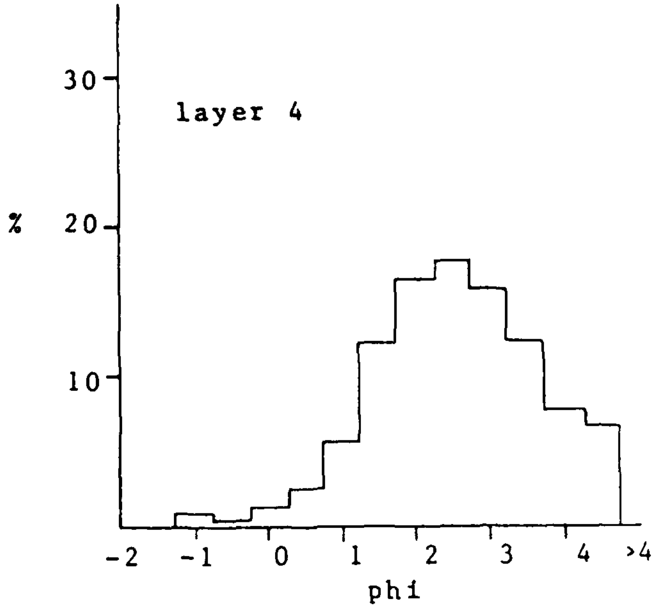


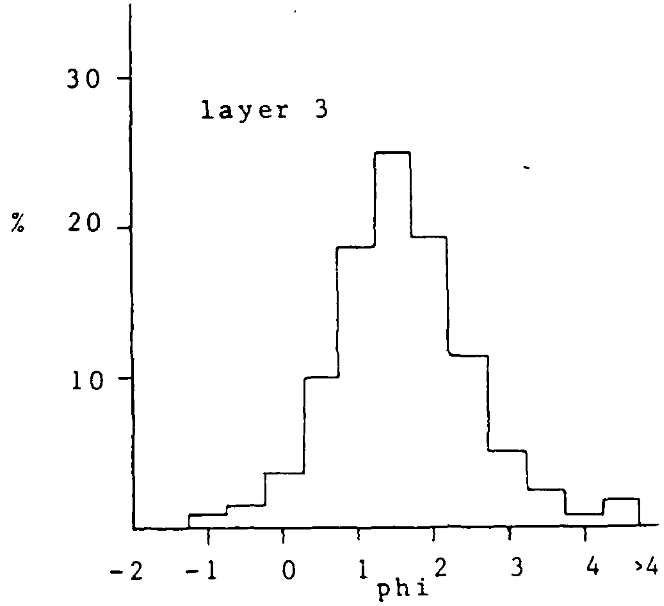




Trench 3

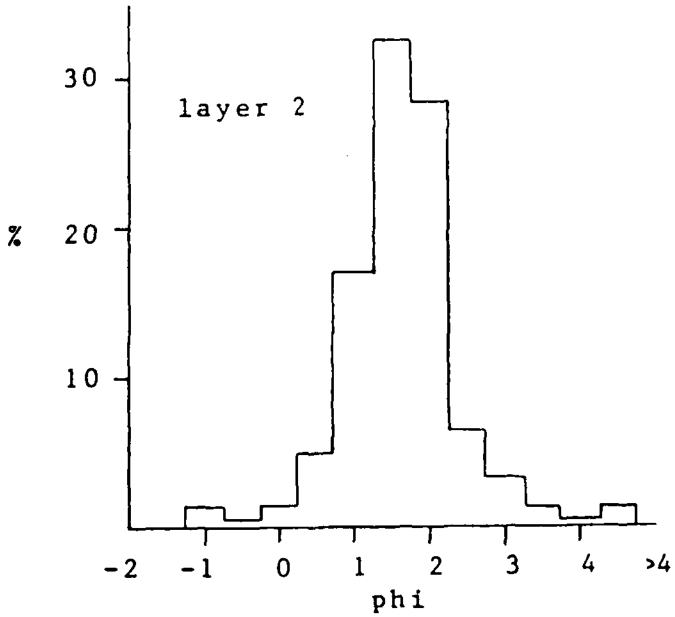
120 feet from west end





Trench 3

150 feet from west end



Discussion

The evidence at the site suggests that the soils and landforms of the area are a function of eolian and fluvial processes during the Holocene Epoch. Fluvial processes are represented only by the lowest layer in trench 3, consisting of overbank floodplain deposit. Approximately 8,000 B.P. the Rio Grande established the present elevation of its floodplain. This elevation controlled the slope of the Valley Border from the floodplain elevation at approximately 3670 ft (1120 m) to the elevation of the La Mesa surface at 4000 ft (1220 m).

With the Rio Grande at this lower elevation, the situation was ideal for the erosion, transportation and deposition of eolian sand in the 41EP2611 project area. The site is on the east side of the floodplain which during low flow periods would have exposed large areas of sandy river bed to the wind. Strong spring winds from the west and northwest picked up this sand and deposited it at the first major obstacle, the Valley Border region of the study area. The site is ideally located to receive sand from the river channel and is also directly perpendicular to the strongest winds. Eolian action would be strongest during times of drought when more river channel is exposed and the adjacent areas are less protected by vegetation. The development of the modern floodplain by 8,000 B.P. and the concurrent change from wetter Pleistocene pluvial climates indicates that conditions favorable for eolian action were not present in the study area until 8,000 B.P. Thus, 8,000 B.P. is the oldest possible age for the lower slightly indurated sands.

The color and carbonate induration of the soils suggests that the lower eolian layer (trench 1, layers 1 and 2; trench 2, layer 1 and 2; and trench 3, layer 2-4) is at least middle Holocene in age. The colors of the soil layers, ranging from 7.5 YR 5/8 (strong brown) for the calcified units, layers 1 and 2 of trench 1, to 7.5 YR 6/8 and 7.5 YR 6/6 (reddish yellow) for layers 1 and 2 (unconsolidated material) of trench 3, are indicative of early to middle Holocene age (Gile et al, 1981). Also, according to Gile et al. (1981), the stage I/II carbonate development of the calcified units indicates an age between 100 and 15,000 years; the carbonate nodules and filaments, as well as the 7.5 YR 5/8 color of the calcified units in trenches 1 and 2, indicate that these soil layers are at least middle Holocene in age and possibly even early Holocene in age (Gile et al, 1981). The synthesis of the geomorphic evidence for a maximum age of 8,000 years and the pedogenic evidence indicates that all but the active surface sands are between 8,000 and about 4,000 years old.

The total absence of soil development and historic evidence suggests that the active sand unit is of late Holocene and probably of historic Anglo period in age. Support for a historic age is provided by York and Dick-Peddie's 1969 study which documents late nineteenth and early twentieth century vegetation changes in the region. Prior to the 1880s the region was largely grass covered; overgrazing by cattle destroyed the grasslands and exposed large barren surfaces to wind action. By this process, older dunes which had been stabilized for thousands of years were reactivated and formed a new active layer on top of the stabilized sand unit.

A review of the specific cultural features demonstrates that they are located on top of or below the indurated units and have not been identified in the areas of active sand. Feature 1 is deposited in soil probably equivalent to Layer 2 or 3 of Trench 1. Feature 2 context is probably also Layer 2 or 3 of Trench 1. Features 4, 6, and 7 occur on the indurated lower eolian layer, equivalent to Layers 1 and 2 of Trenches 1 and 2 and Layers 2-4 of Trench 3. Unexcavated features exposed on hardpan (Features 3, 5, 8, and 9) also apparently occur on the lower eolian layer. The approximately 3600 B.P. age for features 1 and 2 indicates that these features date from after or near the end of the period of eolian activity which produced the lower eolian unit. The 660±60 B.P. age for feature 6 is consistent with its location on top of the older indurated eolian unit. This feature (6) would have been immediately above the floodplain of the Rio Grande and its preservation places limits on the largest flood event since that time.

Packrat midden studies from elsewhere in the Chihuahuan Desert provide a meaningful view of the regional vegetation and climate since the late Pleistocene. These records from the Sacramento Mountains (Van Devender, Betancourt, and Wimberly, 1984), Guadalupe Mountains (Van Devender, Spaulding, and Phillips, 1979), Hueco Tanks (Van Devender and Riskind, 1979), and San Andres Mountains (Van Devender and Toolin, 1983) document the change in regional climate from the last full glacial maxima about 18,000 B.P. to essentially modern conditions approximately 4,000 B.P. Regional conditions during the Holocene are further documented by pollen studies dating from the time of P.S. Martin's study (1963) and additional packrat studies (Van Devender, 1987). From these accounts, most workers recognize three major climatic regimes for the region: Late Wisconsin Maxima >14,000 B.P.; Mid-Holocene, 4,000-8,000 B.P.; and late Holocene <4,000 B.P. The 14,000-8,000 B.P. period is considered as a transition period between the full glacial late Wisconsin climate and the "full- interglacial" Altithermal climate.

Most workers recognize post-Altithermal time as a period in which temperature and precipitation patterns have fluctuated about their present values (Grove, 1979). For the Chihuahuan Desert this means periods of slightly (±2°C) warmer and cooler temperatures and variations in the total amount and seasonality of precipitation. This variability is apparent in the tree-ring record for the region (Dean and Robinson, 1977). Direct and dramatic evidence of a slight shift to less effective moisture during the last 150 years is provided by the 50 to 100 m rise in the lower treeline of junipers (Juniperus spp.) in the mountain ranges of south central New Mexico and West Texas. In many of these ranges there is a belt of dead junipers 50 to 100 m below trees currently living.

Sometime during the 8,000 to 3,600 B.P. period conditions were such that the vegetation on the study area deteriorated to the point that active dune formation occurred, as evidenced by the lower eolian deposits. Elsewhere in the Southwest, north of about 35°N, the Altithermal was both warmer and drier, and there was a significant period of eolian activity (Hack, 1941; La Marche, 1978). At more southerly latitudes, the pollen and packrat midden evidence suggests that the Altithermal was both warmer and wetter and marked a period of stable desert grassland (Martin, 1963; Van Devender and Spaulding, 1979; Van Devender, 1987).

The lower eolian deposits could have been formed in a period as short as the 100 years in which the upper active eolian deposits have formed. The presence of this unit, therefore, is evidence for a short dry period during the generally warmer and wetter Altithermal, which would be expected of a variable climatic regime and not necessarily a long-term period of less effective moisture. Such a period could have happened anytime from 8,000 B.P. until about 3,600 B.P. The carbonate development, color, and topographic position of the unit do not permit a more accurate dating of this unit.

Between the time of the two eolian units there was a period of over 3,000 years in which there was relative surface stability and soil formation. Alternately, cyclical periods of eolian deposition and erosion may have occurred between 3,600 B.P. and 660 B.P. The more recent materials, then, would have capped this fluctuating layer. The onset of renewed eolian activity in the last 100 years has been well documented, but has evoked a wide range of causes. Irrefutable evidence supports the intensity and destructiveness of the livestock grazing at the end of the last century and the early decades of this century (York and Dick-Peddie, 1969; Alford, 1982). Neilson (1986) acknowledges overgrazing, but concludes that a decrease in summer precipitation was the fundamental cause for the loss of the desert grassland in south-central New Mexico and West Texas. His argument initially appears attractive, but the uniqueness of the historic changes and the observed variability of Late *Holocene* climate in the region make a purely climatic cause unlikely.

Flotation analysis of the material from this site supports the widely held observation that for the last 4,000 years, late Holocene time, vegetation in the Chihuahuan Desert has been essentially similar to that of the region prior to the onset of heavy overgrazing during the late 1800s. Vegetation found in the flotation samples are taxa presently found at the site. There was no oak or other taxa which would be expected if the regional environment had been similar to that attributed to the region during earlier periods of the Holocene (Van Devender and Riskind, 1979; Van Devender, Betancourt, and Wimberly, 1984).

The three pollen samples from the site (Jones, Appendix A) are of limited value for confirming or contradicting the reconstructions of the paleoenvironment. Indeed, Jones suggests that some of the taxa are modern contaminants and that the others had too low concentrations for meaningful reconstruction of paleoenvironment. In these samples there are only four taxa groups which are potentially statistically significant; in each sample, Cheno-Ams are significant and in sample EP-3 Quercus, at least, is statistically significant but considered a modern contaminant. The relatively high Cheno-Am sums, although statistically insignificant, could be interpreted to suggest a dominance of a summer convectional precipitation regime (Martin, 1963; Hevly et al, 1965), a pattern which characterizes the region today and which has done so for both middle (Altithermal) Holocene and late Holocene time. In summary, the pollen data do not provide significant reasons for doubting the paleoenvironment as reconstructed in this section.

Summary and Conclusions

The Southeast El Paso archeological site (41EP2611) provides useful evidence for geomorphic and environmental conditions in the region for the last 8,000 years and, in particular, during the past 3600 years. This analysis sought to address the following issues: the relationship of the geomorphic processes affecting the sites; and the relationship of the archeological features to the sedimentology of the sites. The research was performed through field measurement and observations, laboratory grain size analysis, and literature review.

A central theme for the cultural features is that they are located in a zone of episodic eolian sand deposition. The location is ideally suited to receive winds and sand blown off the Rio Grande floodplain. Periods of more active eolian processes can be ascribed to times of drier climate which produce a reduction in vegetation or periods of the physical destruction of the vegetation.

The age of the lower eolian units is fixed by the maximum age of 8,000 years for the establishment of the modern Rio Grande floodplain and the 3600 B.P. age for the cultural material found below, in and on the upper portion of the eolian unit. Soil color and carbonate development corroborate these age limits which indicate a middle Holocene, Altithermal, to earliest late Holocene age for the earlier period of eolian activity.

The youngest age of 660±60 B.P. for features at the site place a maximum age for the most recent period of eolian activity. Historic evidence and the total absence of soil formation support the young age for the upper eolian unit.

These ages for the earlier and later periods of eolian activity bracket a period extending from before 3600 B.P. to sometime after 660 B.P. in which there was relative surface stability at the site. This stable period which includes the times of occupation of the site coincides with the late Holocene. The late Holocene age suggests essentially historic climatic conditions with identifiable periods of slightly wetter to slightly drier precipitation patterns and slightly warmer to slightly cooler temperatures.

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Table 3. American Association of State Highway and Transportation Officials (AASHTO) grain size classification (Blatt, Middleton and Murray, 1980).

	Particle Diameter (mm)	U.S.A. Standard Sieves Class Passing	Retained
Boulders	> 250	--	10 in.
Cobbles	250 - 75	10 in.	3 in.
Gravel	75 - 2	3 in.	No. 10
Coarse sand	2.0 - 0.425	No. 10	No. 40
Fine sand	0.425 - 0.075	No. 40	No. 200
Silt	0.075 - 0.002	No. 200	finer
Clay	0.002 - 0.001	--	--
Colloidal clay	< 0.001	--	--

Table 4. Udden-Wentworth grain size classification (Blatt, Middleton and Murray, 1980).

Class	Particles Diameter (mm)	0 Units
Boulders	> 256	-8
Cobbles	256 - 64	-8 to -6
Pebbles	64 - 4	-6 to -2
Gravel	--	--
Granules	4 - 2	-2 to -1
Very Coarse Sand	2 - 1	-1 to 0
Coarse Sand	1 - 0.5	0 to 1
Medium Sand	0.5 - 0.25	1 to 2
Fine Sand	0.25 - 0.125	2 to 3
Very Fine Sand	0.125 - 0.0625	3 to 4
Silt	0.0625 - 0.0039	4 to 8
Clay	< 0.0039	8

APPENDIX E:

University of Texas-Austin Radiocarbon Laboratory Specimen Data Sheets

Univ. of Texas-Austin Radiocarbon Laboratory SPECIMEN DATA SHEET

---For lab use only---

Average				X-no.	5737
Age	3,500 ± 250	Age		Tx-no.	5737
$\delta^{14}C$	-352.7 ± 9.7‰	$\delta^{14}C$		Published	
$\delta^{13}C$		$\delta^{13}C$			
Run #	2752a	Run #			

Remarks

Submitter fill out the information below and on reverse side of sheet, in as much detail as possible. (Use a separate sheet for each sample.) TYPE OR PRINT.

1. Nature of sample: Charcoal

2. Submitter's catalog number, with identification of catalog (for instance, Univ. of Texas Dept. Anthro. no. 41AD72/219; C. H. Webb No. 16CD12/Log #6):

Sample 1MA235-G-1 Feature 1 Testunit 1 (A) Level 1

3. Name and number of site: MA 235-G-1

4. Descriptive location of site (e.g., so many miles NE of a town, at such and such a place on a given stream):

the site is Located within the City of El Paso, texas, between Zaragosa Road and Avenida de las Americas, 460 m SW of I-10.

5. Latitude & Longitude, at least to the minute:

Lat. 31° 42' North Long. 106° 17' west

6. Location of sample within site, as precisely as possible: coordinates, elevation, zone, other specific provenience data:

131° 29m From main site Datum, 1-10 cm below surface

7. Date of collection, name of collector (person or persons responsible for collection, rather than laborer or student):

5/17/87 Amy C. Earls

(over)

8. Context: For archeological samples--significant artifact association; cultural identification (phase, focus, period, or other), and other context (e.g., geologic) where pertinent. For geologic samples, stratigraphic assignment, etc. Similar data for other types of samples.

the site is located on a large Colluvial slope that has been machine impacted and wind erroded. Ceramics from the site indicate an occupation period between 200-1400 AD.

9. Previous radiocarbon dates, if any, bearing on the problem for which this sample is being dated. Give sample numbers assigned by dating laboratories, name of laboratory, and bibliographic references if any:

None

10. Variables affecting validity of date: If the date turns out differently from what you expected, are there factors in the field or elsewhere which might help explain the discrepancy? (e.g., disturbance, intrusion, uncertainty of stratigraphic assignment, rootlet contamination, method of handling, use of preservative). If none are known, so state:

None Known

11. Significance of sample: What is the problem you are trying to solve? What part do you hope this date will play in its solution? In other words, why do you feel the sample is worth dating?

the Sample would provide an initial date for the Site and confirm dates indicated by associated Ceramic samples

12. Estimated sample age: Your advance guess as to the age of the sample--may be stated as a range:

200 - 1400 AD.

13. Signature of submitter: Amy C. Earls

Type or print name: Amy C. Earls

Address, institutional affiliation: Mariah associates Inc. 2825-C Broadbent Parkway, N.E. Albuquerque NM. 87107

Date: May 29, 1987

Univ. of Texas-Austin Radiocarbon Laboratory SPECIMEN DATA SHEET

---For lab use only---

Average ______ X-no. 5738

Age 3,680 ± 60 Age ______ Tx-no. 5738

$\delta^{14}C$ -367.4 ± 4.4‰ $\delta^{14}C$ ______ Published ______

$\delta^{13}C$ ______ $\delta^{13}C$ ______

Run # ______ Run # ______

Remarks ______

Submitter fill out the information below and on reverse side of sheet, in as much detail as possible. (Use a separate sheet for each sample.) TYPE OR PRINT.

1. Nature of sample: Charcoal
2. Submitter's catalog number, with identification of catalog (for instance, Univ. of Texas Dept. Anthro. no. 41AD72/219; C. H. Webb No. 16CD12/Log #6):
   Sample 17 235-G-1 Feature 1 testunit 1(C) Level 4
3. Name and number of site: MA 235-G-1
4. Descriptive location of site (e.g., so many miles NE of a town, at such and such a place on a given stream):
   the site is located within the city of El Paso, texas, between Zaragosa Road and Avenida de las Americas, 460 m SW of I-10,
5. Latitude & Longitude, at least to the minute:
   Lat. 31°42' North Long 106° 17' west
6. Location of sample within site, as precisely as possible: coordinates, elevation, zone, other specific provenience data:
   131° 29m From main Datum, 30-33 cm below surface,
7. Date of collection, name of collector (person or persons responsible for collection, rather than laborer or student):
   5/19/87 Amy C. Earls

(over)

8. Context: For archeological samples--significant artifact association; cultural identification (phase, focus, period, or other), and other context (e.g., geologic) where pertinent. For geologic samples, stratigraphic assignment, etc. Similar data for other types of samples.
~~the~~ site is Located on a Large Colluvial slope that has been Machine impacted and wind erroded. Ceramics From the Site indicate an occupation period between 200-1400 AD.

9. Previous radiocarbon dates, if any, bearing on the problem for which this sample is being dated. Give sample numbers assigned by dating laboratories, name of laboratory, and bibliographic references if any:
None

10. Variables affecting validity of date: If the date turns out differently from what you expected, are there factors in the field or elsewhere which might help explain the discrepancy? (e.g., disturbance, intrusion, uncertainty of stratigraphic assignment, rootlet contamination, method of handling, use of preservative). If none are known, so state:
None Known

11. Significance of sample: What is the problem you are trying to solve? What part do you hope this date will play in its solution? In other words, why do you feel the sample is worth dating?
the Sample would provide an inital date For the site and Confirm dates indicated by associated Ceramic Samples.

12. Estimated sample age: Your advance guess as to the age of the sample--may be stated as a range:
200-1400 AD

13. Signature of submitter: Amy C. Earls

Type or print name: Amy C. Earls

Address, institutional affiliation: Mariah associates Inc. 2825-C Broadbent Parkway, NE. Albuquerque, NM. 87107

Date: May, 28, 1987

Univ. of Texas-Austin Radiocarbon Laboratory SPECIMEN DATA SHEET

---For lab use only---

Average ______ X-no. 5739

Age 3,570 ± 50 Age ______ Tx-no. 5739

$\delta^{14}C$ -358.7 ± 4.1‰ $\delta^{14}C$ ______ Published ______

$\delta^{13}C$ ______ $\delta^{13}C$ ______

Run # 24516 Run # ______

Remarks ______

Submitter fill out the information below and on reverse side of sheet, in as much detail as possible. (Use a separate sheet for each sample.) TYPE OR PRINT.

1. Nature of sample: Charcoal

2. Submitter's catalog number, with identification of catalog (for instance, Univ. of Texas Dept. Anthro. no. 41AD72/219; C. H. Webb No. 16CD12/Log #6):

Sample 19 235-G-1 Feature 2 test unit 2 Level 2

3. Name and number of site: MA 235-G-1

4. Descriptive location of site (e.g., so many miles NE of a town, at such and such a place on a given stream):

the site is Located within the City of El Paso, texas, between Zaragosa Road and Avenida de las Americas, 460 m SW of I-10.

5. Latitude & Longitude, at least to the minute:

Lat. 31° 42' North Long 106° 17' west

6. Location of sample within site, as precisely as possible: coordinates, elevation, zone, other specific provenience data:

314° 5.3m From main site Datum, 10-20 cm below surface.

7. Date of collection, name of collector (person or persons responsible for collection, rather than laborer or student):

5/18/87 Amy C. Earls

(over)

8. Context: For archeological samples--significant artifact association; cultural identification (phase, focus, period, or other), and other context (e.g., geologic) where pertinent. For geologic samples, stratigraphic assignment, etc. Similar data for other types of samples.
the Site is Located on a Large Colluvial slope that has been machine impacted and wind erroded. Ceramics From the site indicate an occupation period between 200-1400 AD.

9. Previous radiocarbon dates, if any, bearing on the problem for which this sample is being dated. Give sample numbers assigned by dating laboratories, name of laboratory, and bibliographic references if any:
none

10. Variables affecting validity of date: If the date turns out differently from what you expected, are there factors in the field or elsewhere which might help explain the discrepancy? (e.g., disturbance, intrusion, uncertainty of stratigraphic assignment, rootlet contamination, method of handling, use of preservative). If none are known, so state:
none known

11. Significance of sample: What is the problem you are trying to solve? What part do you hope this date will play in its solution? In other words, why do you feel the sample is worth dating?
the Sample would provide an initial date For the site and ConFirm dates indicated by associated Ceramic samples.

12. Estimated sample age: Your advance guess as to the age of the sample--may be stated as a range:
200-1400 AD.

13. Signature of submitter: Amy C. Earls

Type or print name: ~~Amy~~ C. Earls

Address, institutional affiliation: Mariah Associates Inc. 2825-C Broadbent Parkway, NE. Albuquerque, NM. 87107

Date: May 29, 1987

Univ. of Texas-Austin Radiocarbon Laboratory SPECIMEN DATA SHEET

--For lab use only--

Average ______ X-no. 5740

Age 660 ± 60 Age ______ Tx-no. 5740

$\delta^{14}C$ −78 ± 4.8‰ $\delta^{14}C$ ______ Published ______

$\delta^{13}C$ ______ $\delta^{13}C$ ______

Run # ______ Run # ______

Remarks ______

Submitter fill out the information below and on reverse side of sheet, in as much detail as possible. (Use a separate sheet for each sample.) TYPE OR PRINT.

1. Nature of sample: Charcoal
2. Submitter's catalog number, with identification of catalog (for instance, Univ. of Texas Dept. Anthro. no. 41AD72/219; C. H. Webb No. 16CD12/Log #6):
   Sample 20 235-G-1 Feature 6 test unit 4 surface
3. Name and number of site: MA 235-G-1
4. Descriptive location of site (e.g., so many miles NE of a town, at such and such a place on a given stream):
   the site is located within the City of El Paso, texas, between Zaragosa Road and Avenida de las Americas, 460 m SW of I-10.
5. Latitude & Longitude, at least to the minute:
   Lat. 31° 42' North Long 106° 17' west
6. Location of sample within site, as precisely as possible: coordinates, elevation, zone, other specific provenience data:
   350° 550m From main site Datum, surface
7. Date of collection, name of collector (person or persons responsible for collection, rather than laborer or student):
   5/19/87 Amy C. Earls

(over)

8. Context: For archeological samples--significant artifact association; cultural identification (phase, focus, period, or other), and other context (e.g., geologic) where pertinent. For geologic samples, stratigraphic assignment, etc. Similar data for other types of samples.
the site is Located on a Large Colluvial Slope that has been machine impacted and wind eroded. Ceramics From the site indicate an Occupation Period between 200-1400 AD.

9. Previous radiocarbon dates, if any, bearing on the problem for which this sample is being dated. Give sample numbers assigned by dating laboratories, name of laboratory, and bibliographic references if any:
None

10. Variables affecting validity of date: If the date turns out differently from what you expected, are there factors in the field or elsewhere which might help explain the discrepancy? (e.g., disturbance, intrusion, uncertainty of stratigraphic assignment, rootlet contamination, method of handling, use of preservative). If none are known, so state:
None known

11. Significance of sample: What is the problem you are trying to solve? What part do you hope this date will play in its solution? In other words, why do you feel the sample is worth dating?
the Sample would provide an initial date for the site and Confirm dates indicated by associated Ceramic Samples.

12. Estimated sample age: Your advance guess as to the age of the sample- - may be stated as a range:
200-1400 A.D.

13. Signature of submitter: Amy C. Earls

Type or print name: Amy C. Earls

Address, institutional affiliation: Mariah associates Inc.
2825-C Broadbent Parkway, NE. Albuquerque, NM. 87107

Date: May 29, 1987